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NATIONAL DAM SAFETY PROGRAM. IRISH BROOK DAM (NJ00204), PASSAIC--ETC(U)
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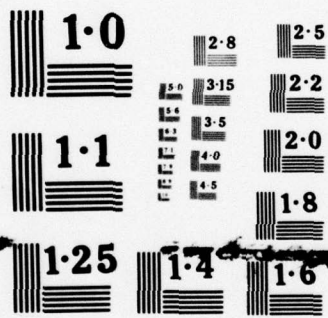
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for 1473*

PASSAIC RIVER BASIN

IRISH BROOK, PASSAIC COUNTY

NEW JERSEY

LEVEL II

IRISH BROOK DAM

**PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**

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**DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106**

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE-2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

28 SEP 1978

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Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Irish Brook Dam in Passaic County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Irish Brook Dam, a high hazard potential structure, is judged to be in reasonably good condition. Irish Brook Dam, along with Post Brook Dam (NJ00220), impounds waters which form Lake Iosco. The combined spillways of the two dams are judged to be inadequate since 7 percent of the Probable Maximum Flood (PMF) would overtop both dams. The decision to consider this dam's spillway "inadequate", rather than "seriously inadequate" as stated by the consultant, is based on overtopping of the concrete dam which should cause only minor damage to the dam, since the abutments and foundations are massive unweathered rock. To insure adequacy of this structure, the following actions, as a minimum, are recommended:

a. The adequacy of the spillway should be determined by a qualified professional consultant, engaged by the owner, using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway should be initiated within calendar year 1979. In the interim, a detailed emergency operation plan and a warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. A program for regularly observing seepage should be implemented within six months from the date of approval of this report.

c. Within six months from the date of approval of this report, the following actions should be initiated.

(1) Brush and vines growing on the downstream face, and decayed vegetation at the toe of the dam should be removed and this area kept clean.

(2) Areas of deteriorated, spalled or seriously cracked concrete should be repaired annually to prevent progressive damage.

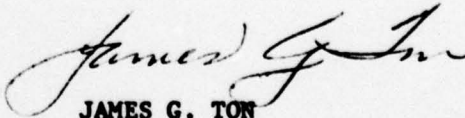
(3) The owner should initiate a program of annual inspections of the dam, utilizing the standard visual check list in this report. Also, a permanent log should be kept of all maintenance and operating events of the dam and lake.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Robert A. Roe of the Eighth District. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia, 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely yours,



JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Cy furn:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N. J. Dept. of Environmental Protection
P.O. Box 2809
Trenton, NJ 08625

IRISH BROOK DAM (NJ00204)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 28 June and 6 July 1978 by Harris-ECI under contract to the State of New Jersey. The state, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

The Irish Brook Dam, a high hazard potential structure, is judged to be in reasonably good condition. Irish Brook Dam, along with Post Brook Dam (NJ00220), impounds waters which form Lake Iosco. The combined spillways of the two dams are judged to be inadequate since 7 percent of the Probable Maximum Flood (PMF) would overtop both dams. The decision to consider this dam's spillway "inadequate", rather than "seriously inadequate" as stated by the consultant, is based on overtopping of the concrete dam which should cause only minor damage to the dam, since the abutments and foundations are massive unweathered rock. To insure adequacy of this structure, the following actions, as a minimum, are recommended:

a. The adequacy of the spillway should be determined by a qualified professional consultant, engaged by the owner, using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway should be initiated within calendar year 1979. In the interim, a detailed emergency operation plan and a warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. A program for regularly observing seepage should be implemented within six months from the date of approval of this report.

c. Within six months from the date of approval of this report, the following actions should be initiated.

(1) Brush and vines growing on the downstream face, and decayed vegetation at the toe of the dam should be removed and this area kept clean.

(2) Areas of deteriorated, spalled or seriously cracked concrete should be repaired annually to prevent progressive damage.

(3) The owner should initiate a program of annual inspections of the dam, utilizing the standard visual check list in this report. Also, a permanent log should be kept of all maintenance and operating events of the dam and lake.

APPROVED: 

JAMES G. TON

Colonel, Corps of Engineers
District Engineer

DATE: 28 Sep 78

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Irish Brook Dam on Lake Iosco, I.D. NJ00204
State Located: New Jersey
County Located: Passaic
Stream: Irish Brook
Date of Inspection: June 28, and July 6, 1978

Assessment of General Condition

The general condition of Irish Brook Dam is good.

The general safety of Irish Brook Dam is considered "seriously inadequate" because of its lack of spillway capacity to pass the PMF (the Spillway Design Flood, SDF, for this dam) without overtopping the dam. Irish Brook Dam along with Post Brook Dam, impound waters which form Lake Iosco. The spillways of these two dams combined are capable of passing a flood equal to 6 percent of the PMF.

At present the engineering data available is not sufficient to make a definitive statement on the stability of the dam.

The following remedial actions, are suggested along with a timetable for their completion.

1. Studies to augment the spillway discharge capacity should be undertaken within six months.

2. A program for regularly observing seepage should be implemented within six months.

Furthermore, while of a less urgent nature, the following additional action is recommended and should be carried out within a reasonable period of time.

1. Brush and vines growing on the downstream face, and decayed vegetation at the toe of the dam should be removed and kept clean.
2. Areas of deteriorated, spalled or seriously cracked concrete should be repaired annually to prevent progressive damage.

Robert Gershowitz, P.E.
Robert Gershowitz, P.E.





IRISH BROOY DAM

View of dam, spillway and both abutments from left shoreline.

June 28, 1978

TABLE OF CONTENTS

ASSESSMENT OF GENERAL CONDITION

		<u>Page</u>
SECTION 1	PROJECT INFORMATION	1
	1.1 General	1
	1.2 Description of Project	2
	1.3 Pertinent Data	5
SECTION 2	ENGINEERING DATA	8
	2.1 Design	8
	2.2 Construction	8
	2.3 Operation	8
	2.4 Evaluation	9
SECTION 3	VISUAL INSPECTION	10
	3.1 Findings	10
	3.2 Evaluation	12
SECTION 4	OPERATION PROCEEDURES	13
	4.1 Procedures	13
	4.2 Maintenance of Dam	13
	4.3 Maintenance of Operating Facilities	14
	4.4 Evaluation	14
SECTION 5	HYDRAULIC/HYDROLOGIC	15
	5.1 Evaluation of Features	15

TABLE OF CONTENTS

(Continued)

	<u>Page</u>
SECTION 6 STRUCTURAL STABILITY	19
6.1 Evaluation of Structural Stability	19
SECTION 7 ASSESSMENT/REMEDIAL MEASURES	21
7.1 Dam Assessment	21
7.2 Remedial Measures	22
7.3 Recommendations	23

PLATES

	<u>No.</u>
VICINITY MAP	1
GEOLOGIC MAP	2
PLAN AND DETAILS OF DAM	3

APPENDICES

APPENDIX A	-	CHECK LIST - VISUAL OBSERVATIONS CHECK LIST - ENGINEERING, CONSTRUCTION MAINTENANCE DATA
APPENDIX B	-	PHOTOGRAPHS
APPENDIX C	-	SUMMARY OF ENGINEERING DATA
APPENDIX D	-	HYDROLOGIC COMPUTATIONS
APPENDIX E	-	STABILITY CALCULATIONS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

IRISH BROOK DAM ON LAKE IOSCO, ID. NJ00204

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

The National Dam Inspection Act (Public Law 92-367, 1972) provides for the National Inventory and Inspection Program by the U.S. Army Corps of Engineers. This inspection was made in accordance with this authority under Contract C-FPM No. 35 with the State of New Jersey who, in turn, is contracted to the Philadelphia District of the Corps of Engineers.

b. Purpose of Inspection

The visual inspection of the Irish Brook Dam was made on June 28, and July 6, 1978. The purpose of the inspection was to make a general assessment as to the structural integrity and operational adequacy of the dam structure and its appurtenances.

c. Scope of Report

This report summarizes available pertinent data relating to the project; presents a summary of visual observations made during the Field Inspection; presents an evaluation of hydrologic and hydraulic conditions at the site; presents an evaluation as to the structural adequacy of the various project features; and assesses the general condition of the dam with respect to safety.

1.2 Description of Project

a. Description of Dam and Appurtenances

Irish Brook Dam is a mass concrete structure with a maximum height of about 16.5 feet. Section dimensions were obtained from a plan on file with the New Jersey Department of Environmental Protection. The crest width is 3.0 feet; the upstream face slopes back at 1 horizontal to 12 vertical; the downstream face is vertical from the crest for the first 2 feet, then slopes outward 7 horizontal to 12 vertical. The dam axis is straight. The total length of the dam is 259 feet as measured during the Field Inspection. This does not agree with the values shown on Plate 3. Freeboard at the time of the inspection was about 1.3 feet.

Bedrock outcrops occur in both abutments and available plans indicate that the dam is founded on rock.

The spillway is a broad crested weir fitted with flashboards. Total spillway length is 44.1 feet with a depth of 16 inches as surveyed during the Field Inspection. A notch 25 inches deep was constructed in a 4 foot section on the left side of the spillway and functions as a service spillway.

An 18-inch diameter cast iron pipe, fitted with a flange plate and two 6-inch gate valves, is located 22.5 feet left of the spillway, 15 feet below the crest. The pipe and valves have been plugged and are no longer operable.

The spillway discharges into a poorly defined natural channel. The ground downstream of the dam is gently sloped and heavily wooded. The streambed contains numerous gravels, cobbles, boulders and debris. Two culverts lie beneath the access road downstream. Both culverts are 30-inch diameter concrete pipes.

b. Location

Irish Brook Dam is located in Passaic County, New Jersey. It is accessible by way of Morse Lake Road. The dam is on land owned by the Lake Iosco Corporation with private property roadway access.

c. Size and Hazard Classification

Irish Brook Dam is classified in the dam size category as being "intermediate", since its storage is less than 50,000 acre-feet and may be slightly more than 1,000 acre-feet. Its size classification based on height would be "small" since its height is less than 40 feet, but the larger size category governs. A hazard potential classification of "high" has been assigned to the project in the National Inventory of Dams and this classification is concurred with because the Field Inspection revealed that a failure of the dam could cause extensive loss of life or excessive property damage.

d. Ownership

Irish Brook Dam is owned by the Lake Iosco Corporation, 3 Morse Lake Road, Bloomington, New Jersey, 07403: Attention: Mr. Richard Zuidema.

e. Purpose of Dam

The lake is used only for recreation, mostly swimming, boating and fishing.

f. Design and Construction History

The dam was constructed around 1923, on what is now the south end of Lake Iosco. No computations for the design of the original structure were available. No records of the original construction were available.

g. Normal Operational Procedures

The discharge from the lake is normally unregulated, however, the water level in the lake is very stable. It was reported that the water level is lowered 1.5 to 2 feet each fall. The water level is allowed to return to its normal level each spring by the collection of the natural inflow into the reservoir.

1.3 Pertinent Data

a. Drainage Area - 3.7 square miles

b. Discharge at Damsite

Maximum known flood at damsite	N.A.
Warm water outlet at pool elevation	N.A.
Diversion tunnel low pool outlet at pool elevation	N.A.
Diversion tunnel outlet at pool elevation	N.A.
Gated spillway capacity at pool elevation	N.A.
Gated spillway capacity at maximum pool elevation	N.A.
Ungated spillway capacity at maximum pool elevation	21 cfs (El. 268.8)
Total spillway capacity at maximum pool elevation	21 cfs

c. Elevation (Feet above MSL)

Top of dam	270
Maximum pool-design surcharge	268.8
Full flood control pool	N.A.
Recreation pool	267.9
Spillway crest	268.8 (Main Spillway) 267.9 (Spillway Notch)
Upstream portal invert diversion tunnel	N.A.
Downstream portal invert diversion tunnel	N.A.
Streambed at centerline of dam	260 \pm feet
Maximum tailwater	N.A.

d. Reservoir

Length of maximum pool	4,800 feet
Length of recreation pool	4,600 feet
Length of flood control pool	N.A.

e. Storage (Acre-Feet)

Recreation pool	990 acre-feet (El. 267.9)
Flood control pool	N.A.
Design surcharge	1,056 acre-feet (El. 268.8)
Top of dam	1,137 acre-feet (El. 270)

f. Reservoir Surface (Acres)

Top of dam	75 acres (El. 270)
Maximum pool	74 acres (El. 268.8)
Flood control pool	N.A.
Recreation pool	73 acres (El. 267.9)
Spillway crest	73 acres (El. 267.9)

g. Dam

Type	Straight Concrete Gravity
Length	259 feet
Height	16.5 feet
Top width	3.0 feet
Face slopes - Upstream	1 horizontal to 12 vertical
- Downstream	7 horizontal to 12 vertical

Zoning	N.A.
Impervious core	N.A.
Cutoff	N.A.
Grout curtain	None

h. Diversion and Regulating Tunnel (N.A.)

i. Spillway

Type	Overflow
Width of weir	44.1 feet; 4 feet (Spillway Notch)
Crest elevation	267.9
Gates	N.A.
Upstream channel	Reservoir
Downstream channel	Irish Brook

j. Regulating Outlets

One 18-inch C.I. pipe (Inoperable).

SECTION 2: ENGINEERING DATA

2.1 Design

No drawings or computations pertaining to original construction, modification or repair of the dam could be found. No foundation borehole or geologic investigation data could be found. The design strength for the mass concrete is unknown. The only available drawing is dated October 3, 1923, showing the plan, profile and sections for the dam. This drawing is available from the New Jersey Department of Environmental Protection.

2.2 Construction

No records have been found and the owner's representative has no knowledge of the construction history of the dam.

2.3 Operation

No records of operation of the lake are kept by the owner. The only operating rule is to lower the lake each fall to protect boat docks during the winter. Otherwise, the lake is allowed to operate naturally without regulation.

2.4

Evaluation

a. Availability

No engineering data was available for the original section apart from the previously mentioned drawing.

b. Adequacy

While the engineering data was insufficient to perform a comprehensive, definitive evaluation of the dam's stability, an adequate assessment of the dam could be carried out with the data obtained in the field in view of the overall good condition of the dam.

c. Validity

The field inspection appears to substantiate the available plan and section to the extent that could be determined by visual observations.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The visual inspection made of Irish Brook Dam did not reveal any signs of distress in the dam. The dam appeared to be in reasonably good condition with adequate maintenance.

b. Dam

Moderate concrete spalling has occurred on the downstream face of the dam. Considerable spalling has occurred in the mortar cap placed on the crest. Little or no spalling was observed on visible portions of the upstream face. No evidence of structural cracking was found.

Vines were observed growing up the face of the dam, rooted in cracks.

There were no indications of either horizontal or vertical movement of the structure.

Biotite gneiss crops out about 50 feet north of the dam's left abutment and about 20 feet upstream of the right abutment. Foliation trends north-south in these massive joint-free outcrops.

Records available from the New Jersey Department of Environmental Protection indicate that the dam is founded on rock.

Some horizontal construction joints show evidence of past leakage with the presence of leaching deposits, however, virtually all joints were dry at the time of the inspection. A seep was observed approximately 20 feet downstream of the dam near the right abutment. Estimated seepage was about 2 g.p.m. and appeared to be free of fine soil grains.

c. Appurtenant Structures

Spillway

The downstream surface is moderately spalled. The surface has been patched numerous times to keep it in good condition. A vertical construction joint was observed on the right side of the spillway. While the joint had been patched with mortar, it continues to seep and a build-up of leaching deposits was observed.

d. Reservoir Area

The reservoir rim is gently sloped and no indications of instability were readily apparent. The slopes above the reservoir are heavily wooded. No buildings or dwellings are built on or near the shoreline, with only a few boat docks on the shoreline. The property around the lake is privately owned and it was reported that access to the lake is limited to members of the Lake Iosco Corporation.

e. Downstream Channel

The discharge channel is a poorly defined natural brook. There are numerous cobbles and boulders at the base of the spillway and along the channel. Side slopes are gentle with heavy vegetation and tree growth. Numerous dead trees and debris obstruct the channel.

3.2 Evaluation

At the time of the inspection, the dam appeared to be functioning adequately with no apparent signs of distress. The seepage observed does require regular observation. The spillway appears to be in reasonable condition. Abutments appear to be in very good condition. Reservoir slopes show no readily apparent signs of instability and are not believed a potential threat to the safety of the dam.

A further assessment of the dam appears in subsequent sections and recommendations appear at the end of Section 7.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

Irish Brook Dam is used to impound water for recreation activities. The strategy is to maintain a nearly constant lake level. The lake level is normally maintained by unregulated discharge over the spillways of Post Brook Dam and Irish Brook Dam, both on Lake Iosco.

The lake level is lowered each fall by releasing water through the sluice gate in Post Brook Dam. The lake is usually lowered about 15 to 18 inches below the normal level, during the winter and is allowed to refill naturally in the early spring. Every 5 to 7 years the lake is lowered to the bottom of the sluice gate for inspection and maintenance of the upstream face. The next inspection is tentatively scheduled for 1980.

4.2 Maintenance of the Dam

There is no program of regular inspection and maintenance of the dam and appurtenant structures. Operation and maintenance is done by the Lake Iosco Corporation. Monthly directors meetings are held. The minutes of these meetings report actions and conditions relative to the dam.

4.3 Maintenance of Operating Facilities

An 18-inch diameter cast iron pipe, fitted with a flange plate and two 6-inch gate valves, is located 22.5 feet left of the spillway, 15 feet below the crest. The pipe and valves have been plugged and are no longer operable. The sluice gate located in Post Brook Dam is the only facility for draining the lake. Operation is every 5 to 7 years as previously noted and maintenance is as needed.

4.4 Evaluation

Surveillance and maintenance is in the hands of the Lake Iosco Corporation. A formalized program of periodic inspection by an experienced party should be initiated and documentation recorded to assist the owner.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design

The drainage area above the Irish Brook Dam is approximately 3.7 square miles. The drainage area is common to both the Post Brook Dam and the Irish Brook Dam. The two dams impound water in the same reservoir, named Lake Iosco. The Irish Brook Dam is located at the south end of the reservoir, and the Post Brook Dam is located at the east side of the reservoir. The drainage area above the dams was delineated from U.S.G.S. quadrangle topographic maps. A drainage map of the watershed of the two dams is presented on Plate 1, Appendix D.

The topography within the basin is generally hilly. There are some lakes and a few swampy areas at the northeast section of the watershed. Elevations range from approximately 1,190 feet above mean sea level in the hills at the northeast end of the watershed to about 270 feet at the Irish Brook damsite.

Land use patterns within the watershed are mostly forest in the hilly sections, and urban around the lakes in the northeast section. The southern portion of Norvan Green State Forest is within the watershed of the Post Brook Dam and the Irish Brook Dam.

The evaluation of the hydraulic and hydrologic features of the Irish Brook Dam was based on criteria set forth in the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, and additional guidance provided by the Philadelphia District, Corps of Engineers. The Probable Maximum Flood (PMF) was calculated from the Probable Maximum Precipitation (PMP) using Hydrometeorological Report No. 33 with standard reduction factors. Due to the small drainage area of the Irish Brook and Post Brook Dams, the SCS triangular hydrograph, transformed to a curvilinear hydrograph, was adopted for developing the unit hydrograph. The derived unit hydrograph is presented under the section of hydrologic computations.

Initial and infiltration loss rates were applied using the SCS procedure with the PMP to obtain rainfall excesses. The rainfall excesses were then applied to the unit hydrograph to obtain the PMF hydrograph utilizing the Corps of Engineers' computer program HEC-1. The computed peak discharges of the PMF and one-half of the PMF are 16,544 cfs and 8,272 cfs respectively.

Both the PMF and one-half the PMF inflow hydrographs were routed through the reservoir by the Modified Puls Method, utilizing the HEC-1 computer program. The spillway and overtop discharge rating curve of Irish Brook Dam was combined with the spillway and overtop discharge rating curve of Post Brook Dam for the flood routing. The peak outflow discharges for the PMF and one-half of the PMF for the two dams are 16,041 cfs and 7,977 cfs, respectively. Both the PMF and one-half of the PMF result in overtopping of both dams.

The spillway and overtop discharge rating curve of the Irish Brook and Post Brook Dams was prepared assuming free overflow across the whole length of the dams and spillways. The reservoir stage-capacity data were based on the U.S.G.S. quadrangle topographic maps in combination with data given in the National Dam Safety Inventory Table. Reservoir storage capacity includes surcharge levels exceeding the top of the dam. The spillway and overtop discharge rating curves of the two dams and the combined spillway and overtop discharge rating curve were prepared assuming the dams remain intact during routing. The spillway and overtop discharge rating curve of the Irish Brook and Post Brook Dams and the combined spillway and overtop discharge rating curve of the two dams are presented in Plate 2, 2A and 2B. The reservoir capacity curve is also presented in Plate 3 of Appendix D.

b. Experience Data

No records of lake levels are maintained for this site. The lake level is normally stable, however, it was reported that the dam has been overtopped up to 3 inches during severe storms.

c. Visual Observations

The valley below the dam is heavily wooded with much debris. There are few dwellings immediately downstream of the dam along the periphery of Irish Brook. The slopes around the lake are moderate to steep and heavily wooded. There is little evidence of sedimentation in the lake.

d. Overtopping Potential

As indicated in Section 5.1-a., both the Probable Maximum Flood and one-half of the Probable Maximum Flood, when routed through the Lake Iosco reservoir result in overtopping of the Post Brook Dam and the Irish Brook Dam. The PMF and one-half of the PMF overtopped Irish Brook Dam by 4.2 feet and 2.6 feet, respectively. In determining the overtopping heights it was assumed that both the dams remain in their present condition, such that outflow occurs over both the dams during the floods, according to the existing structural dimensions of the dams. The spillways of the two dams are only capable of passing a flood equal to approximately 6 percent of the PMF without overtopping the dams. Since the PMF is the Spillway Design Flood (SDF) for Irish Brook Dam, according to the Recommended Guidelines for Safety Inspection of Dams by the Corps of Engineers, the spillway capacity of the dam is considered "seriously inadequate".

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

At the time of the inspection the dam did not exhibit any visible signs of distress. There was no evidence of tilting, misalignment or movement on the foundation. The dam is founded on competent rock. The surface spalling and deterioration of concrete does not affect the structural strength or stability. Based on a visual inspection, and in view of more than 50 years of satisfactory past performance, the structure appears to be stable.

b. Design and Construction Data

No design or construction data was available. The only available data is the drawing showing the section, profile and plan for the dam.

c. Operating Records

No operating records were available.

d. Post-Construction Changes

There have been no known post-construction changes.

e. Static Stability

Approximate calculations do not indicate instability against overturning. An adequate factor of safety exists against bearing capacity failure. Resistance to sliding is provided by the soil at the downstream toe of the dam in addition to adhesion between the concrete and bedrock, as well as normal frictional resistance. The degree of adhesion and surface irregularities between concrete and bedrock are unknown, therefore, it was not possible to perform reliable calculations pertaining to sliding. Nevertheless, in view of past performance and with no visual indications of distress, potential sliding is not considered a problem. Stability calculations are shown in Appendix E.

f. Seismic Stability

Three faults within about 1-1/4 miles of the dam have been mapped by others. The dam is located in Seismic Zone 1, as defined in Recommended Guidelines For Safety Inspection of Dams as prepared by the Corps of Engineers. In general, projects located in Seismic Zones 0, 1 and 2 may be assumed to present no hazard from earthquake, provided the static stability conditions are satisfactory and conventional safety margins exist.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

The safety of Irish Brook Dam is in question because there is inadequate capacity in the spillway to pass the PMF or one-half the PMF flood without overtopping the dam. Overtopping of the dam could cause extensive loss of life or excessive property damage downstream. Overtopping of the dam should cause only minor damage to the dam since the abutments and foundation are massive unweathered rock. The present spillways of Irish Brook Post Brook Dams combined can pass only about 6 percent of the PMF.

No definitive statement pertaining to the stability of the structure can be made without acquisition of the engineering properties of the soil providing passive resistance downstream, active thrust upstream, and the foundation. Nevertheless, the present dam has performed adequately since it was built in 1923, without failure or evidence of instability.

b. Adequacy of Information

The information and data uncovered is not adequate to perform a comprehensive, definitive evaluation of the dam's stability. Nevertheless, in view of the past performance of the dam, its present condition, and in light of stability calculations performed, it is not felt that additional information on the engineering properties of the local soil and foundation is necessary at this time.

c. Urgency

Studies to augment the spillway discharge capacity should be made within six months, and a plan formulation should be completed within a 12-month period.

A program for regularly observing seepage should be implemented within six months.

7.2 Remedial Measures

The alternatives available for increasing the spillway capacity are:

1. Increasing the dam height, of both Irish Brook Dam and Post Brook Dam, thus, permitting a higher discharge to pass both spillways without overtopping.
2. Increase the spillway capacity at Irish Brook Dam, Post Brook Dam, or both.
3. A combination of the above alternatives.

It must be emphasized that both dams must be modified at the same time for alternatives involving raising the dam.

Based on the visual inspection and data evaluation presented herein, the following action is recommended.

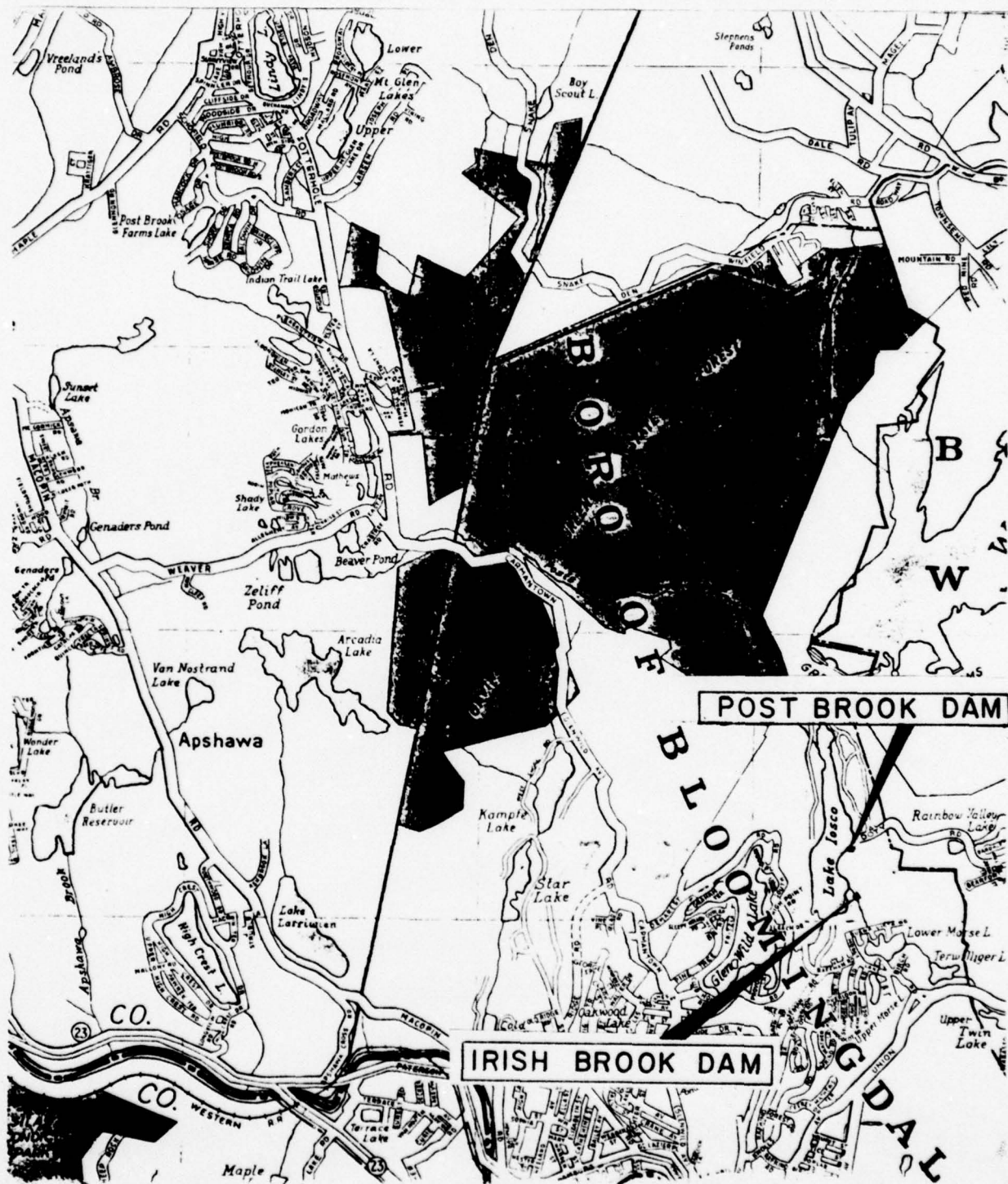
Brush and vines growing on the downstream face, and decayed vegetation at the toe should be removed and kept clean.

Areas of deteriorated, spalled or seriously cracked concrete should be repaired annually to prevent progressive damage.

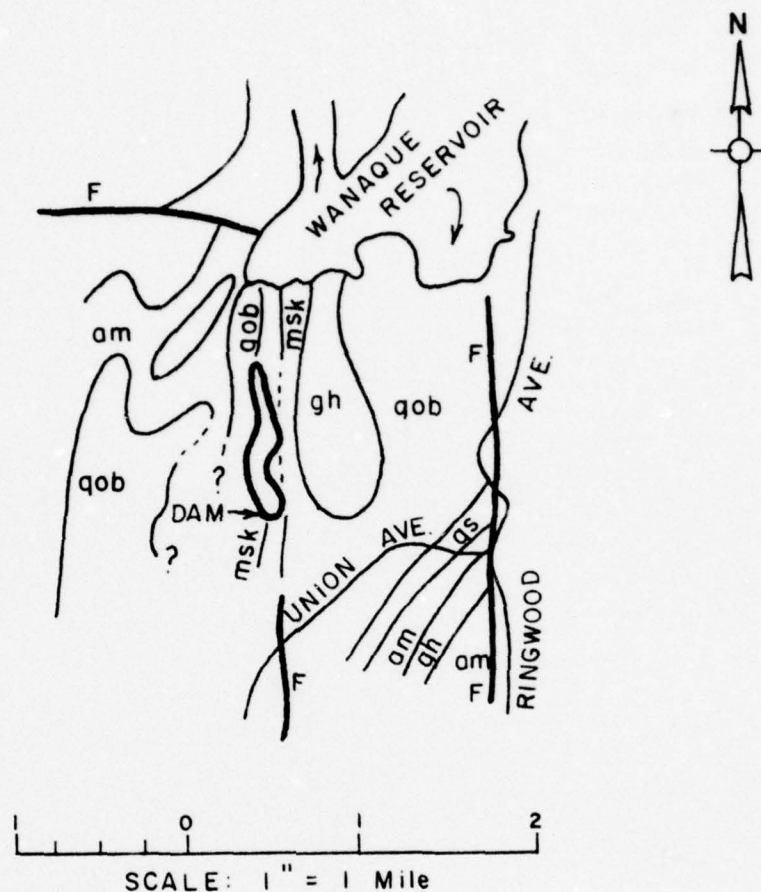
The owner should initiate a program of annual inspections of the dam, utilizing the standard visual check list in this report.

A permanent log should be kept of all maintenance and operating events of the dam and lake.

PLATES



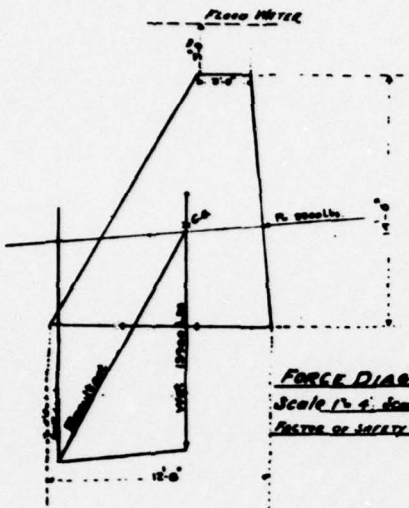
VICINITY MAP



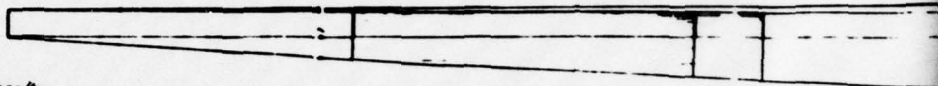
LEGEND

gh	MOSTLY HORNBLLENDE GRANITE AND GNEISS
hqa	HYPERSTHENE - QUARTZ-ANDESINE GNEISS
am	AMPHIBOLITE
qob	QUARTZ-OLIGOCLASE - BIOTITE GNEISS
msk	MARBLE AND SKARN
qs	SILLIMANITE GNEISS

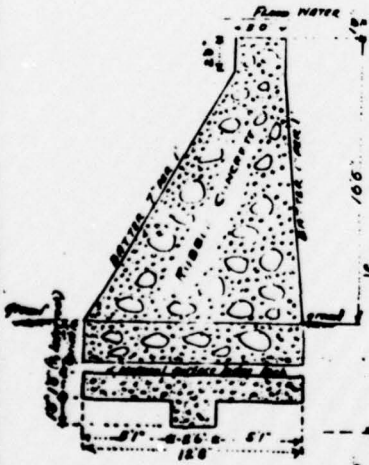
GEOLOGIC MAP IRISH BROOK DAM



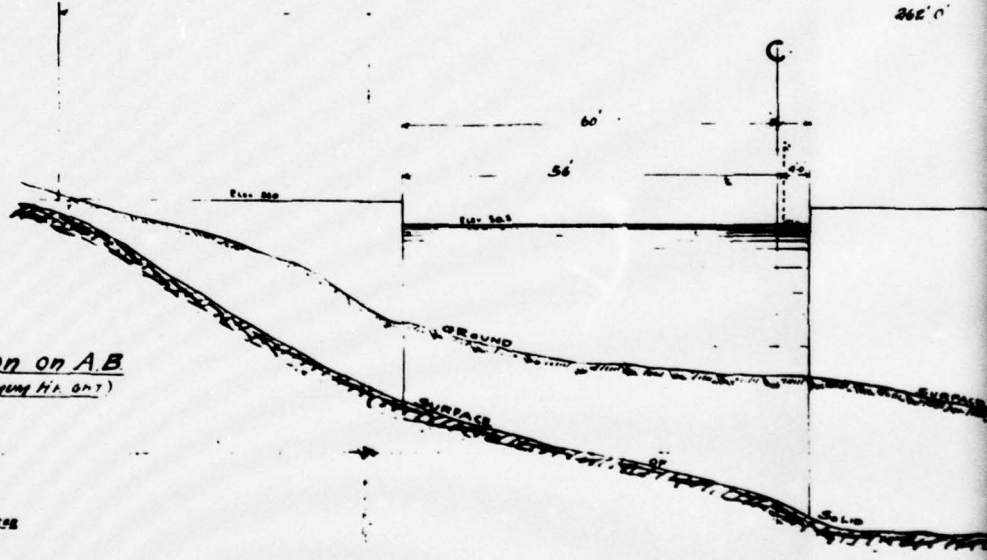
FORCE DIAGRAM
 Scale 1" = 4' Scale 1" = 1000 lb
 FACTOR OF SAFETY AGAINST OVERTURNING 2.1



PLAN
 SCALE 1" = 10'

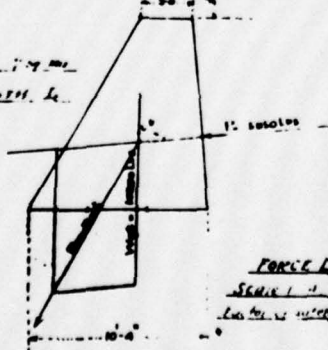


Section on A.B
 (MAXIMUM H.A. 507)

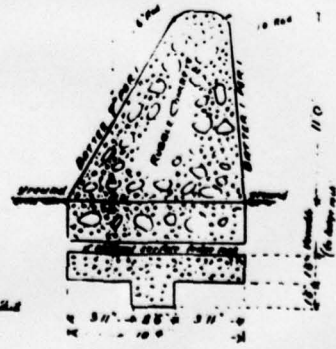


D

Drainage Area 1.74 mi.
 Spillway Length 1.4
 in Years 10 to 20
 100% 50'



FORCE DIAGRAM
 Scale 1" = 4' Scale 1" = 1000 lb
 FACTOR OF SAFETY AGAINST OVERTURNING 2.1



Section on C.D
 (AT SPILLWAY)

PROF
 (ELEVATION 100)
 HOR SCALE 1" = 10'

APPENDIX A

CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION
MAINTENANCE DATA

CHECK LIST

Visual Inspection
Phase I

Name Dam Irish Brook County Passaic State New Jersey Coordinators _____

Date(s) Inspection June 28, 1978 Weather Clear-Warm Temperature 80°F

Pool Elevation at Time of Inspection _____ M.S.L. Tailwater at Time of Inspection _____ M.S.L.
W.S. @ upper crest of spillway.

Inspection Personnel:

(June 28, 1978)

Joe Sirianni

(July 6, 1978)

Yin Au-Yeung

Henry King

Lynn Brown

David Kerkes

Robert B. Campbell Recorder

Owner Representative:

(June 28, 1978)

Niel Dunning, President

Lake Iosco Corporation

c/o Richard Zuidema, Secretary (Not Present)

Morse Lake Road

Bloomington, New Jersey 07403

CONCRETE/MASONRY DAMS

Irish Brook

Type - Straight Concrete Gravity Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	Concrete shows no significant leakage. Some minor evidence of leaching through horizontal construction joints. Virtually all joints were dry at time of inspection. Many surface patches have been applied to downstream surface with moderate success at controlling seepage. Minor seepage showing about 70 feet downstream and wet up to toe at right abutment.	Clean and waterproof upstream face of dam to minimize seepage. Observe and record monthly condition of flow from seep or spring to detect changes in quantity or clarity of water.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Concrete placed directly on bedrock. Junctions generally good. Rock outcrops at left and right abutment.	
DRAINS	None - N.A.	
WATER PASSAGES	See Outlet Works.	
FOUNDATION	Dead vegetation has been allowed to build up at base of dam.	Rotting leaves and vegetation should be cleaned away from toe of dam annually.

CONCRETE/MASONRY DAMS

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Minor surface cracks. Concrete surfaces weathered and moderate surface spalling on downstream face. Upstream face had had 1/2 to 3/4" mortar coating which is weathered but little spalling. Top of crest same but much more spalling.	Inspect dam annually to detect new seepages and/or spalled areas. Apply face slabs or other waterproofing to upstream face whenever new seepages are found.
STRUCTURAL CRACKING	No evidence of structural cracking can be found.	
VERTICAL AND HORIZONTAL ALIGNMENT	No evidence of movement of the dam can be found.	
MONOLITH JOINTS	Keyed vertical construction joint (VCJ) about 15' right of spillway. Downstream face of VCJ patched with mortar. Joint is dry. Possible VCJ or crack at right side of spillway, also patched with mortar, but seeping with 1/16" leach deposit. Vegetation growing in joint on left side downstream.	See above.
CONSTRUCTION JOINTS	Horizontal construction joints tight and dry.	See above.

EMBANKMENT

Irish Brook

Type - None

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N.A.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N.A.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N.A.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	N.A.	
RIPRAP FAILURES	N.A.	

EMBANKMENT

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N.A.	
ANY NOTICEABLE SEEPAGE	N.A.	
STAFF AND GAGE RECORDER	N.A.	
DRAINS	N.A.	

OUTLET WORKS

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Abandoned pipe through dam. Pipe reported to be plugged with concrete on wet side.	
INTAKE STRUCTURE	Submerged and not visible. Cannot be inspected.	
OUTLET STRUCTURE	None.	
OUTLET CHANNEL	Heavily wooded.	
EMERGENCY GATE	None.	

UNGATED SPILLWAY

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Two level wier with rounded crest and stop board slot in top. Each level has 2 x 8" board in slot. Surface has been patched numerous times to keep surface in reasonably good condition.	Continue inspection and patching.
APPROACH CHANNEL	None.	
DISCHARGE CHANNEL	None - Natural channel meanders downstream. Heavily wooded.	Dead wood and debris should be removed from area.
BRIDGE AND PIERS	None.	

GATED SPILLWAY
(None)

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	N.A.	
APPROACH CHANNEL	N.A.	
DISCHARGE CHANNEL	N.A.	
BRIDGE AND PIERS	N.A.	
GATES AND OPERATION EQUIPMENT	N.A.	

INSTRUMENTATION

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

RESERVOIR

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gently sloping away from lake. Slopes are heavily wooded and appear stable.	
SEDIMENTATION	Sedimentation appears to be occurring very slowly.	
SHORELINE STRUCTURES	No dwellings on or near shorelines. Only structures on shoreline are boat docks and watersport associated facilities.	
USE	Recreation only -- Mostly boating and fishing. No power boats allowed on lake.	
OPERATION	Reservoir is drawn down to bottom of outlet slot in Post Brook Dam (also on Lake Iosco) every 5 to 7 years for inspection and repair of upstream face of dam, and for homeowners. Next inspection tentatively scheduled for 1980. Reservoir is lowered 1-1/2 to 2 feet each winter and raised again in early spring.	

DOWNSTREAM CHANNEL

Irish Brook

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Very heavily wooded and rocky. Poorly defined waterway. Much debris of all kinds. Two 30" diameter concrete pipe culverts under private road. Discharge channel is 3 to 4 feet below road.	
SLOPES	Very flat and broad valley bottom. Gentle sideslopes. Slopes heavily wooded with many rock outcrops.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	No dwellings immediately downstream. All dwellings in area are well above watercourse.	

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION

Irish Brook Dam on Lake Iosco

ITEM	REMARKS
PLAN OF DAM	Available.
REGIONAL VICINITY MAP	Available.
CONSTRUCTION HISTORY	None available. Records on file with the New Jersey Environmental Protection Agency indicate that the dam was built about 1923.
TYPICAL SECTIONS OF DAM	Available.
HYDROLOGIC/HYDRAULIC DATA	None available.
OUTLETS - PLAN)
- DETAILS) None Available.
- CONSTRAINTS)
- DISCHARGE RATINGS)
RAINFALL/RESERVOIR RECORDS	None Available.

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION
(Continued)

Irish Brook Dam on Lake Iosco

ITEM	REMARKS
DESIGN REPORTS	None available.
GEOLOGY REPORTS	None available.
DESIGN COMPUTATIONS)
HYDROLOGY & HYDRAULICS) None available.
DAM STABILITY)
SEEPAGE STUDIES)
MATERIALS INVESTIGATIONS)
BORING RECORDS) None available.
LABORATORY)
FIELD)
POST-CONSTRUCTION SURVEYS OF DAM	None available.
BORROW SOURCES	Unknown.
SPILLWAY - PLAN)
- SECTIONS) Available.
- DETAILS)

CHECK LIST
ENGINEERING DATA

DESIGN, CONSTRUCTION, OPERATION
(Continued)

Irish Brook Dam on Lake Iosco

ITEM	REMARKS
OPERATING EQUIPMENT PLANS AND DETAILS) None available.)
MONITORING SYSTEMS	None available.
MODIFICATIONS	None.
HIGH POOL RECORDS	None available.
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available.
PRIOR ACCIDENTS OR FAILURE OF DAM - DESCRIPTION - REPORTS	No reports of accidents or failure were found during the investigation.
MAINTENANCE, OPERATION RECORDS	None available.

APPENDIX B

PHOTOGRAPHS

All photos were taken on June 28, 1978.

Irish Brook Dam



Photo 1 - View of dam, spillway and both abutments from left shoreline.



Photo 2 - View of dam and notch spillway from right shoreline.

Irish Brook Dam

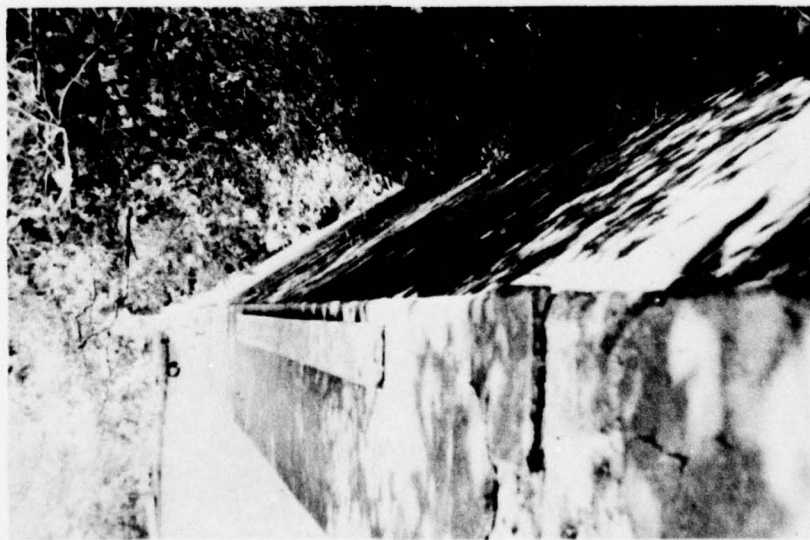


Photo 3 - Crest and downstream face of dam.

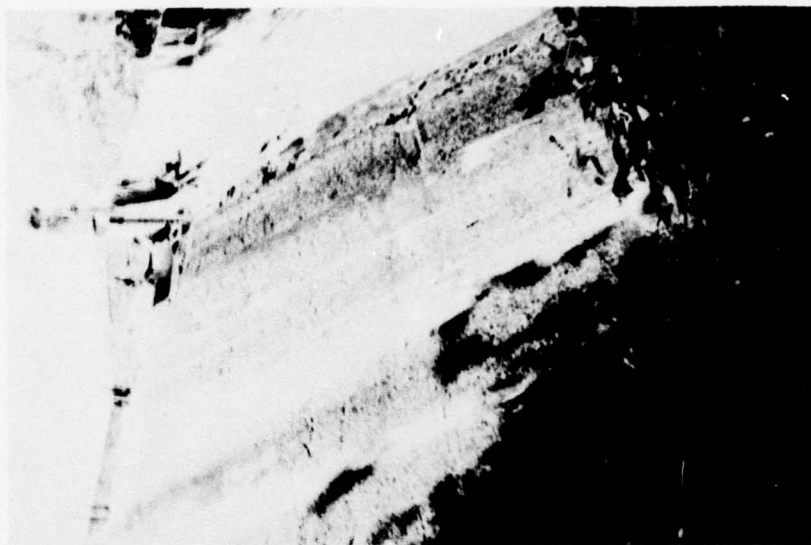


Photo 4 - Spalling and deterioration of concrete on downstream face of notch spillway.

Irish Brook Dam



Photo 6 - Looking at downstream toe and area from right side of spillway.



Photo 5 - View of seepage right side of dam.

Irish Brook Dam



Photo 7 - Construction joint and
spalling left side of
notch spillway.



Photo 8 - View of two 6-inch valves installed on flange
plate on plugged 18-inch cast iron pipe.

Irish Brook Dam



Photo 9 - Two culverts under private road downstream of dam.



Photo 10 - Discharge channel looking upstream from culverts.

Irish Brook Dam



Photo 11 - View of discharge
channel looking toward
the dam.



Photo 12 - Discharge channel looking toward dam.

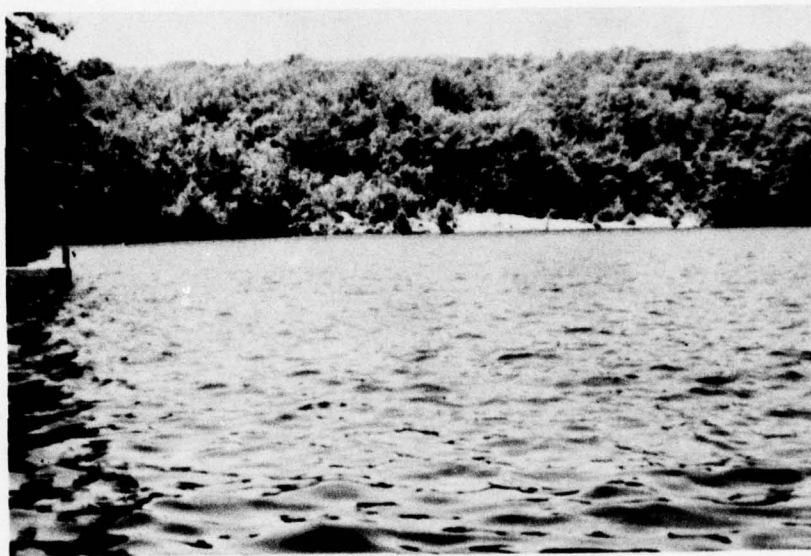


Photo 13 - Lake Iosco and right shoreline showing rock outcrop.

APPENDIX C

SUMMARY OF ENGINEERING DATA

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

Name of Dam: Irish Brook Dam
Drainage Area: 3.7 square miles
Elevation Top Normal Pool (Storage Capacity): 267.9 (990 AF)
Elevation Top Flood Control Pool (Storage Capacity): N.A.
Elevation Maximum Design Pool: 268.8
Elevation Top of Dam: 270

SPILLWAY CREST:

a. Elevation: 267.9
b. Type: Overflow
c. Width: 44.1 feet
d. Length: N.A.
e. Location Spillover: Mid-section of the dam
f. Number and Type of Gates: None

OUTLET WORKS: (N.A.)

a. Type: _____
b. Location: _____
c. Entrance Inverts: _____
d. Exit Inverts: _____
e. Emergency Draindown Facilities: _____

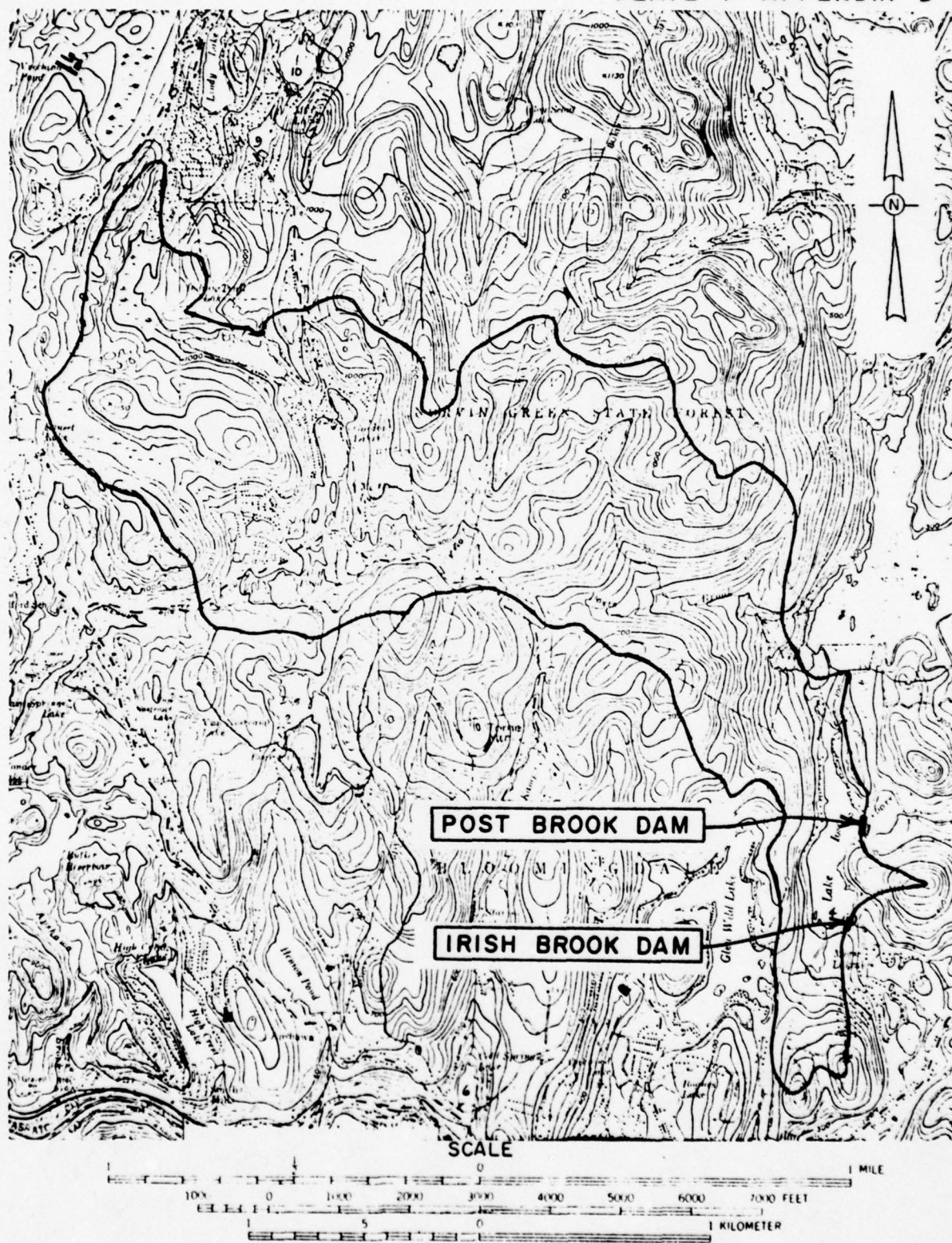
HYDROMETEOROLOGICAL GAGES: (N.A.)

a. Type: _____
b. Location: _____
c. Records: _____

MAXIMUM NON-DAMAGING DISCHARGE: 239 cfs (Estimated)

APPENDIX D

HYDROLOGIC COMPUTATIONS



IRISH BROOK AND POST BROOK DAMS
DRAINAGE MAP

NEW JERSEY (STATE) DAM SAFETY INSPECTION

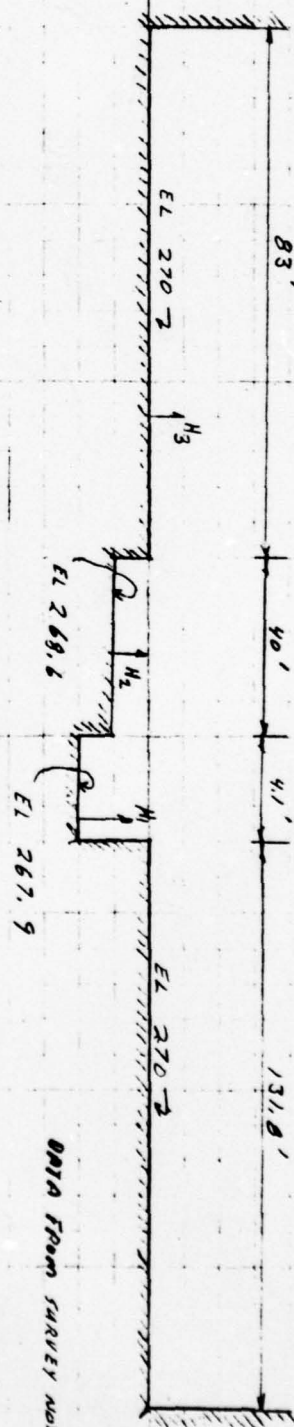
SHEET NO. 1 OF

IRISH BROOK DAM

JOB NO. 1212-001-1

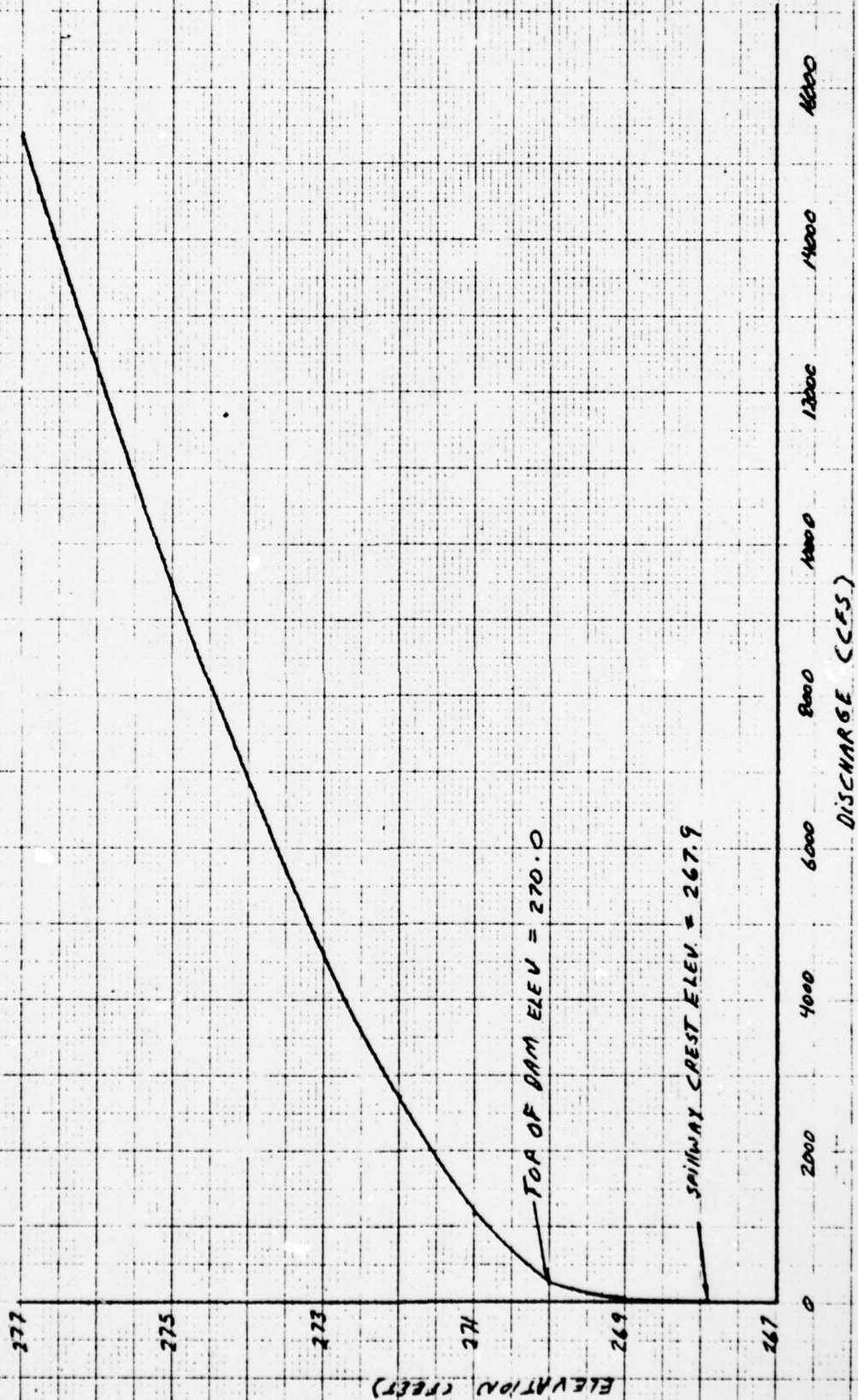
SPILLWAY AND OVERTOP RATING CURVE

BY KL B DATE 8-9-78



ELEV (FT)	HEAD ON main SPILLWAY CREST	H ₁	H ₂	H ₃	L ₁	L ₂	L ₃	C ₁	C ₂	C ₃	
267.7	0.0	0.0			4.1						0
268.6	0.7	0.7			4.1			3.03			7.3
269.0	1.1	1.1	0.4		4.1	40.0		3.03	3.03		45.0
270.0	2.1	2.1	1.4		4.1	40.0		3.03	3.03		238.6
271.0	3.1	3.1	2.4	1.0	4.1	40.0	214.8	3.03	3.03	3.03	1169.3
272.0	4.1	4.1	3.4	2.0	4.1	40.0	214.8	3.03	3.03	3.03	2703.8
273.0	5.1	5.1	4.4	3.0	4.1	40.0	214.8	3.03	3.03	3.03	4643.6
275.0	7.1	7.1	6.4	5.0	4.1	40.0	214.8	3.03	3.03	3.03	9474.0
277.0	9.1	9.1	8.4	7.0	4.1	40.0	214.8	3.03	3.03	3.03	15371.5

IRISH BROOK DAM
SPILLWAY AND OVERTOP RATING CURVE

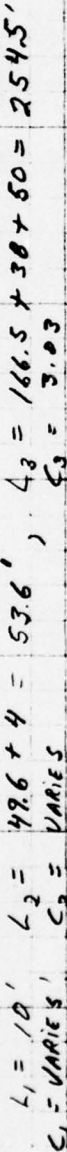


POST BROOK DAM

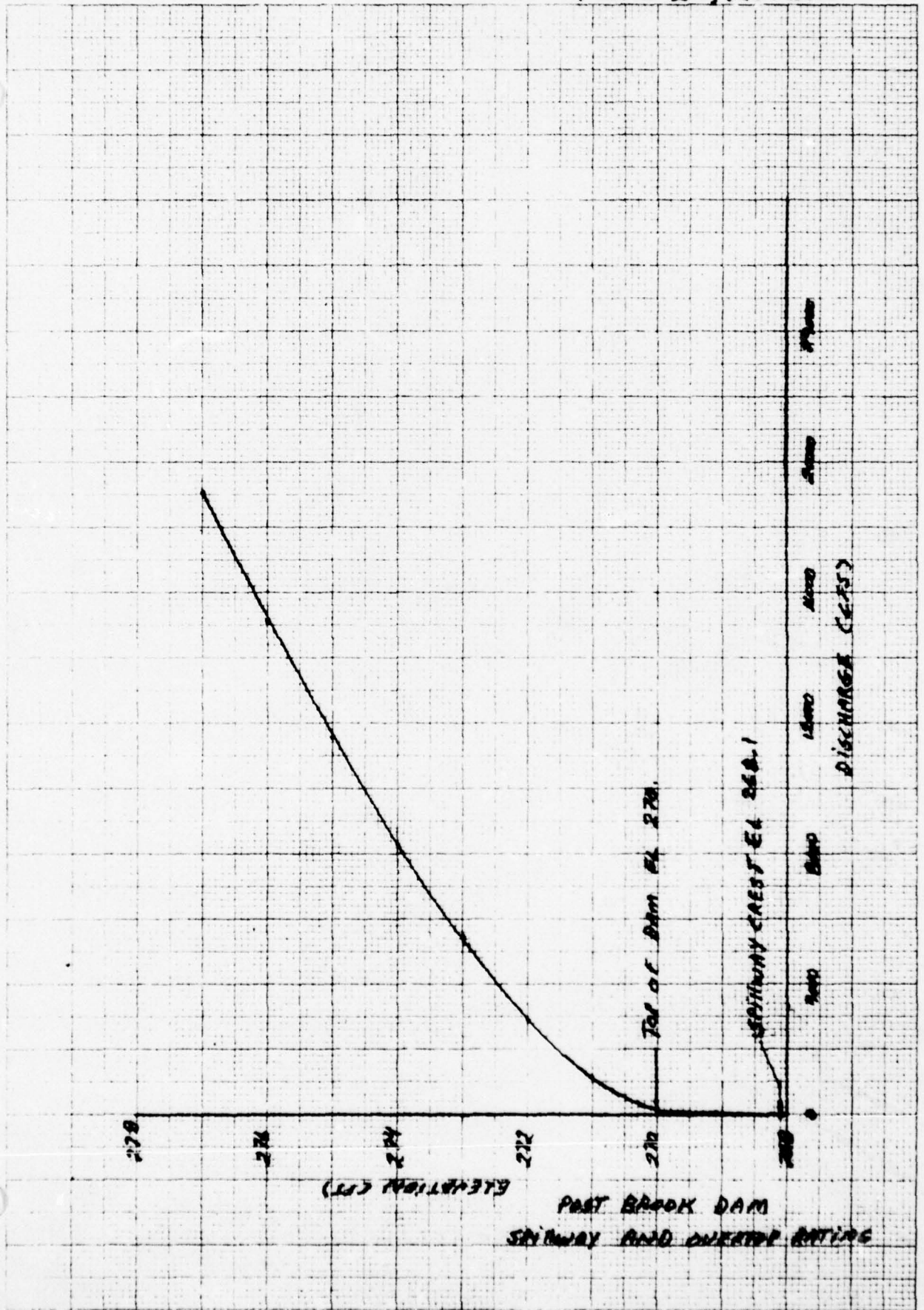
JOB NO. 1212-001-1

BY KLB

DATE 8-7-78



ELEV.	HEAD ON MAIN CHY. WAY CREST	H ₁ (FT)	H ₂ (FT)	H ₃ (FT)	L ₁ (FT)	L ₂ (FT)	L ₃ (FT)	C ₁	C ₂	C ₃	$Q = \sum_{i=1}^3 C_i L_i H_i$ (CFS)
268.1	0	0	0	0							0
269.0	0.9	0.9	0	0	10			3.2			27.3
270.0	1.9	1.9	0	0	10			3.4			89.0
271.0	2.9	2.9	1.0	1.0	10	53.6	254.5	3.6	3.2	3.03	1121.0
272.0	3.9	3.9	2.0	2.0	10	53.6	254.5	3.8	3.4	3.03	2989
273.0	4.9	4.9	3.0	3.0	10	53.6	254.5	3.8	3.6	3.03	5422
274.0	5.9	5.9	4.0	4.0	10	53.6	254.5	3.8	3.8	3.03	8843
275.0	6.9	6.9	5.0	5.0	10	53.6	254.5	3.8	3.8	3.03	11588
276.0	7.9	7.9	6.0	6.0	10	53.6	254.5	3.8	3.8	3.03	15120
277.0	8.9	8.9	7.0	7.0	10	53.6	254.5	3.8	3.8	3.03	19063



ENGINEERING CONSULTANTS, INC.

NEW JERSEY (STATE) DAM SAFETY INSPECTION

SHEET NO. 1 OF

POST BROOK AND IRISH BROOK DAMS

JOB NO. 12/2-001-1

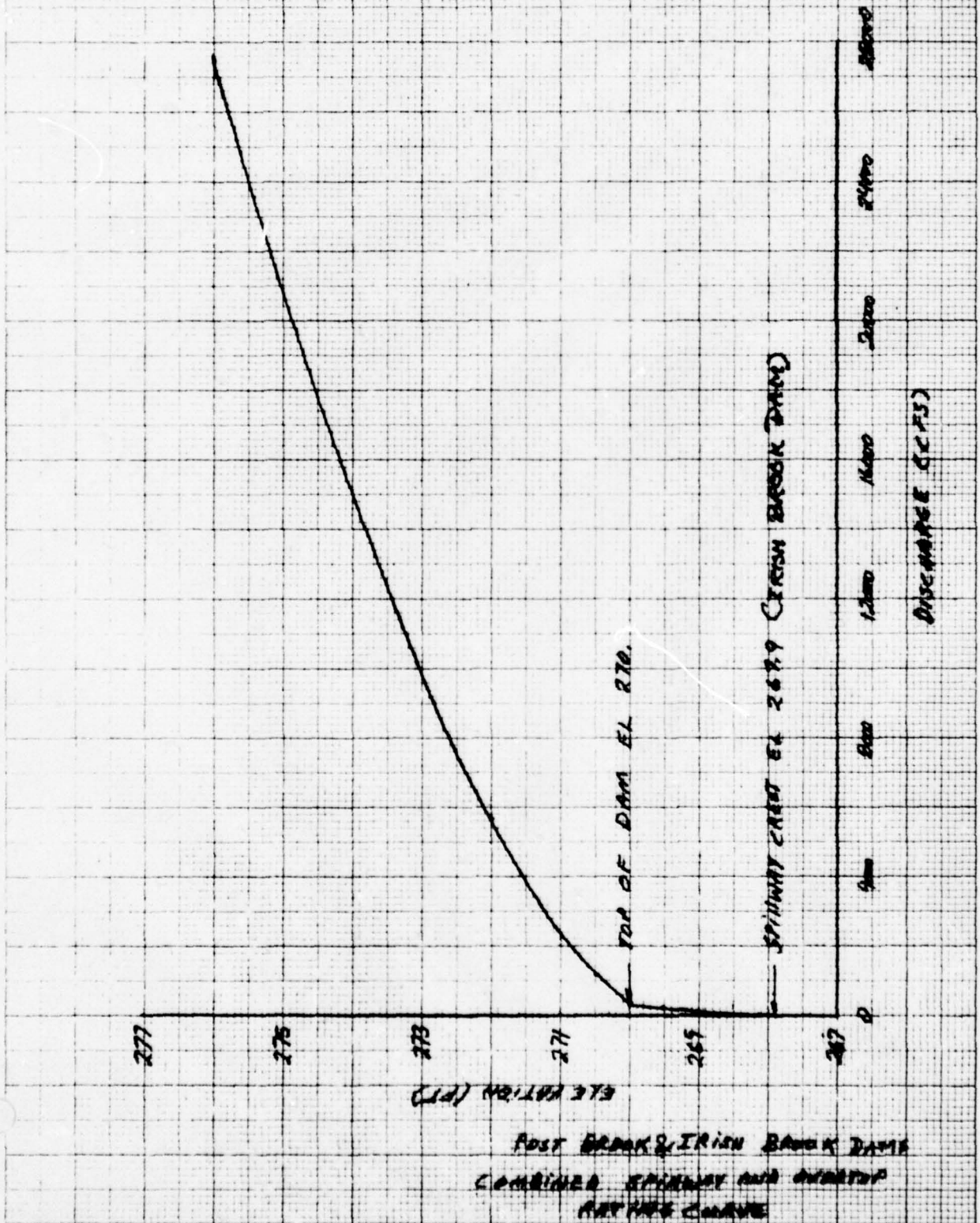
COMBINED OVERTOP + SPILLWAY DISCHARGES

BY EBI DATE 8-11-78

POST BROOK AND IRISH BROOK DAMS

COMBINED SPILLWAY & OVERTOP DISCHARGES

ELEV. (CFT)	POST BROOK DAM (DISCHARGE) (CFS)	IRISH BROOK DAM (DISCHARGE) (CFS)	TOTAL DISCHARGE (CFS)
267.9 (SPILLWAY CREST) Irish Bk. Dam	-	0	0
268.1 (SPILLWAY CREST) Post Bk. Dam	0	3.5	3.5
269.0	29.3	45.0	72.3
269.5	80.0	120.0	200.0
269.9	88.0	230.0	318
270.0 (TOP OF DAMS)	89.0	238.6	327.6
270.1	200.0	360.0	560.0
270.5	500.0	700.0	1200.0
272.0	2989.0	2703.8	5692.8
276.0	15170.0	12300.0	27470.0



NEW JERSEY (STATE) DAM SAFETY INSPECTION

SHEET NO. 1 OF

POST BROOK AND IRISH BROOK DAMS

JOB NO. 1212-001-1

RESERVOIR AREA CAPACITY DATA

BY KLB DATE 8-9-78

LAKE IOSCORESERVOIR AREA CAPACITY DATA

MAXIMUM STORAGE = 1056 AC-FT

NORMAL STORAGE = 990 AC-FT

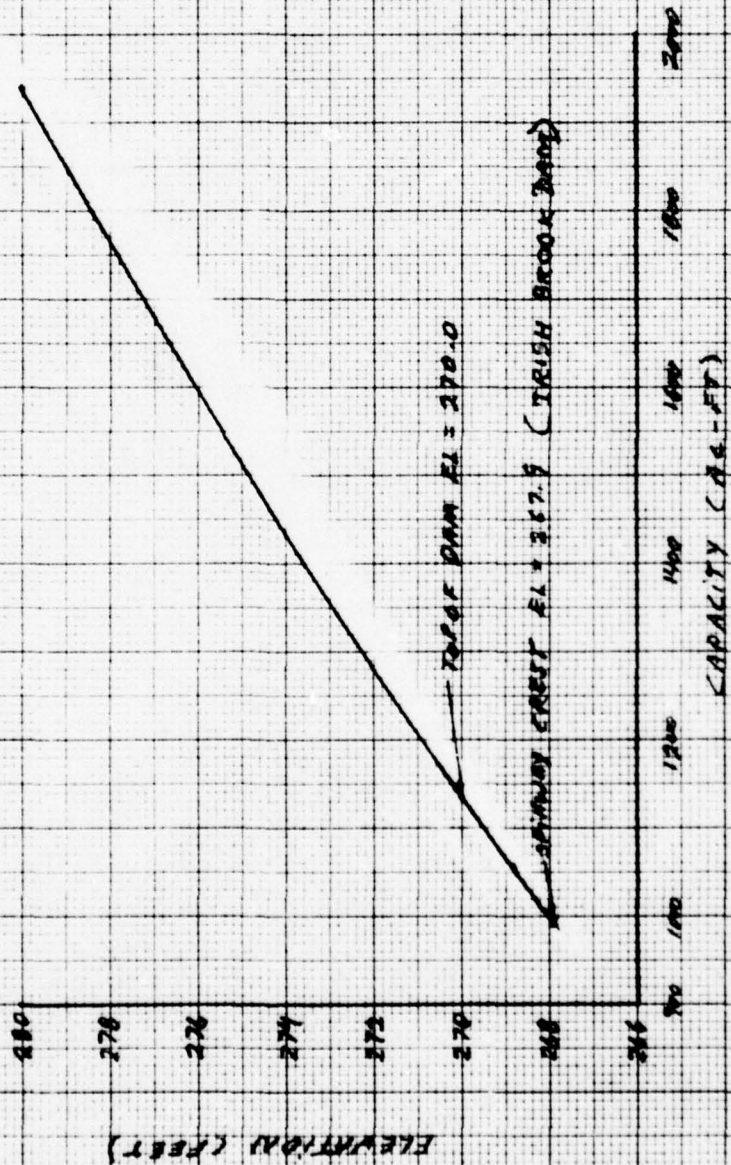
RESERVOIR SURFACE AREA = 73 ACRES

AT AN ELEVATION OF 267.9 ±

ELEV (FT)	HEAD ON SPILLWAY CREST (Irish Bk. Dam)	RESERVOIR AREA (ACRES)	RESERVOIR VOLUME (AC-FT)	REMARKS
267.9 ±	0.	73	990	NORMAL VOLUME OF 990 AC-FT IS ASSUMED TO BE AT SPILLWAY CREST of Irish Brook Dam
268.1	0.2	73.2	1005	Volume at spillway crest of Post Bk. Dam
268.8	0.9	74	1056	Elev. at maximum Storage
270.0	2.1	75	1137	STORAGE AT TOP OF DAM
280.0	12.1	85	1937	
300.0	32.1	138	4167	

PLATE 3, APPENDIX D

POST BROOK AND IRISH BROOK DAMS
RESERVOIR CAPACITY CURVE
LAKE TOSCO



NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 1 OF
 POST BROOK AND IRISH BROOK DAMS JOB NO. 1212-001-1
 UNIT HYDROGRAPH BY HLB DATE 7-26-75

UNIT HYDROGRAPH - POST BROOK, IRISH BROOK

a) DRAINAGE AREA = 3.7 SQ. MI.

b) $L = 3.79$ MILES (FROM PAGE 2)

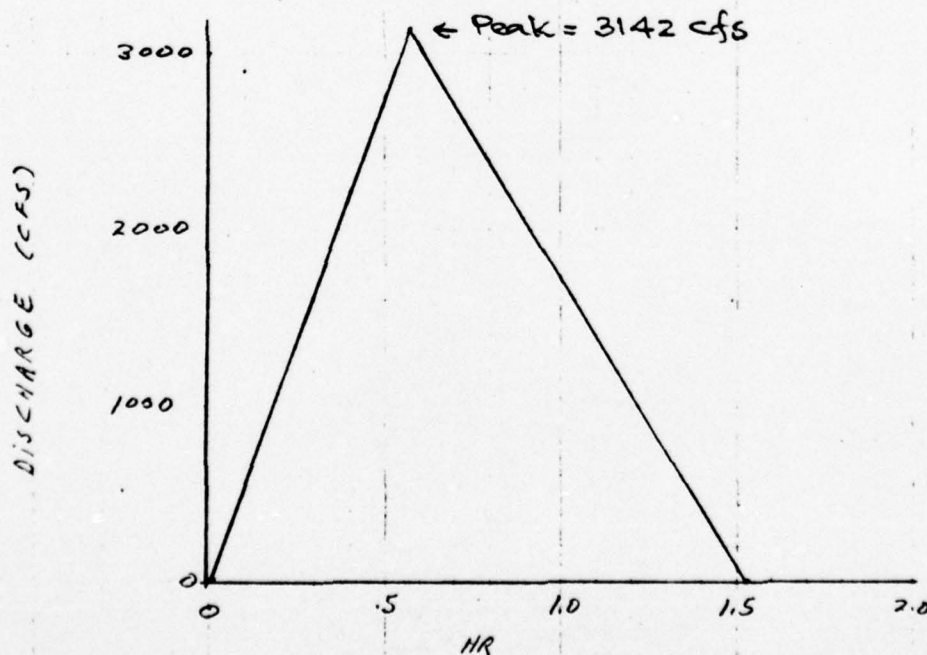
c) $T_c = 0.87$ HR (FROM PAGE 2)

d) ASSUME $D = 0.10 < \frac{T_c}{2}$

e) $T_p = \frac{D}{2} + 0.6 T_c = 0.05 + 0.6 \times 0.87$
 $= 0.57$ HR

f) $T_b = 2.67 T_p = 2.67 \times 0.57 = 1.53$ HR

g) $q_p \text{ cfs} = \frac{484 A (\text{SQ. MI})}{T_p (\text{HR})} = \frac{484 \times 3.7}{0.57} = 3142 \text{ CFS}$



ENGINEERING CONSULTANTS, INC.

NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 2 OF
 POST BROOK DAM, IRISH DAM JOB NO. 1712-101-1
 DETERMINE BASIN PARAMETERS. BY HLB DATE 7-26-77

FROM U.S.G.S. QUAD SHEETS

DRAINAGE AREA = 3.750 MI.

DETERMINE LENGTH OF STREAM

$$L = 10.00'' \times \frac{24000}{12 \times 5280} = \underline{3.79 \text{ MILES}} = \underline{20000 \text{ FT.}}$$

DETERMINE BASIN SLOPE

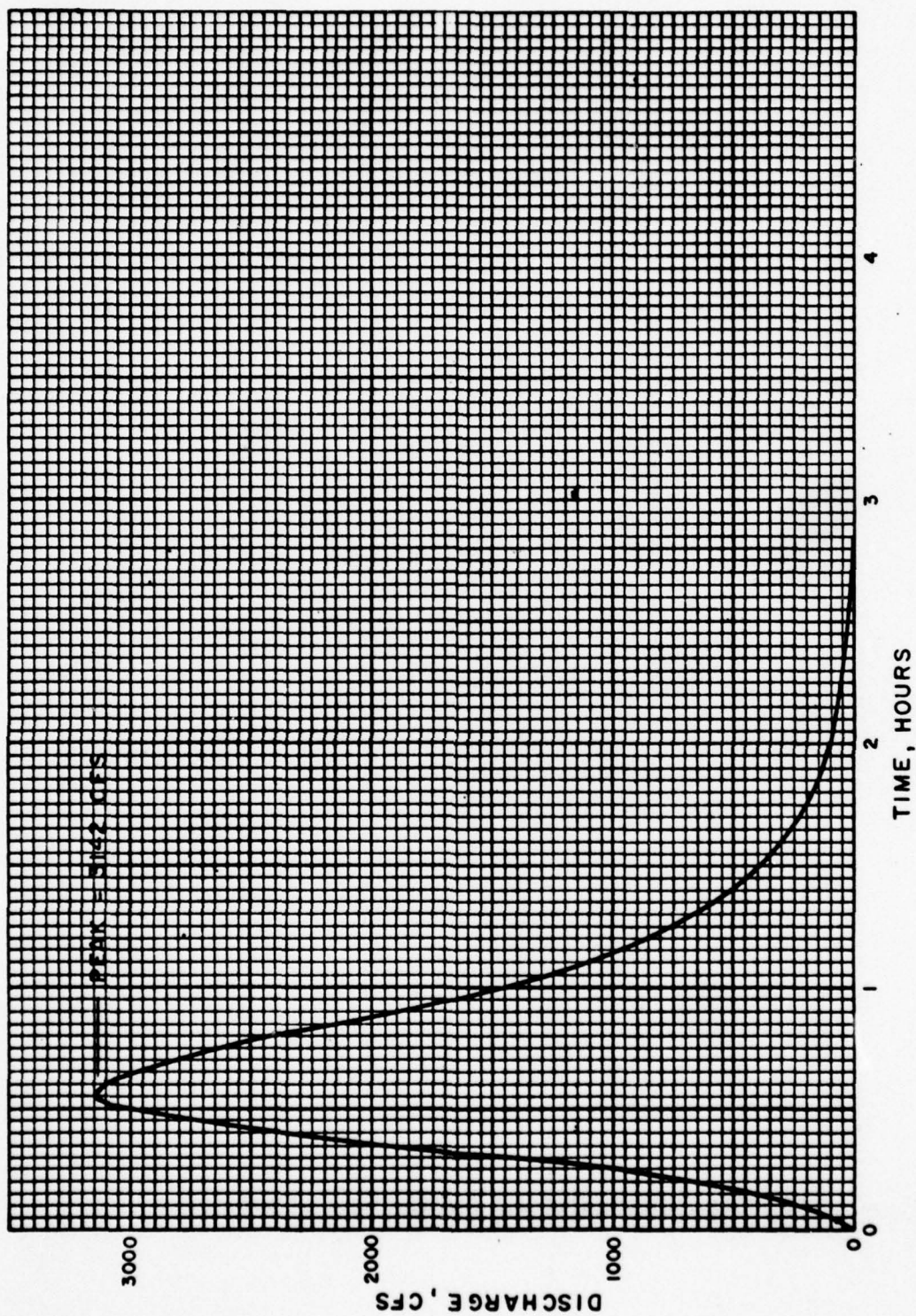
$$\Delta H = 1190 - 270 = \underline{920 \text{ FT.}}$$

DETERMINE TIME OF CONCENTRATION

$$\begin{aligned} T_c &= \left(\frac{11.9 L^3}{\Delta H} \right)^{0.385} = \left(\frac{11.9 \times 3.79^3}{920} \right)^{0.385} \\ &= \underline{0.87 \text{ HR.}} \end{aligned}$$

NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 3 OF
 POST BROOK & IRISH BROOK DAMS JOB NO. 1212-001-1
 UNIT HYDROGRAPH BY HLB DATE 7-26-7

TIME RATIO T/Tp	DISCHARGE RATIO q/q _p	UNIT GRAPH	
		TIME (HR)	DISCHARGE (CFS)
0	0	0	0
0.1	0.015	0.06	47.1
0.2	0.075	0.11	235.7
0.3	0.16	0.17	502.7
0.4	0.28	0.23	879.8
0.5	0.43	0.29	1351.1
0.6	0.60	0.34	1885.2
0.7	0.77	0.40	2419.3
0.8	0.89	0.46	2796.4
0.9	0.97	0.51	3047.7
1.0	1.00	0.57	3142.0
1.1	0.98	0.63	3079.2
1.2	0.92	0.68	2890.6
1.3	0.84	0.74	2639.3
1.4	0.75	0.80	2356.5
1.5	0.66	0.86	2073.7
1.6	0.56	0.91	1759.5
1.8	0.42	1.03	1319.6
2.0	0.32	1.14	1005.4
2.2	0.24	1.25	754.1
2.4	0.18	1.37	565.6
2.6	0.13	1.48	408.5
2.8	0.098	1.60	302.9
3.0	0.075	1.71	235.7
3.5	0.036	2.00	113.1
4.0	0.018	2.28	56.6
4.5	0.009	2.57	28.3
5.0	0.004	2.85	12.6



IRISH BROOK AND POST BROOK DAMS
0.10 HOUR UNIT HYDROGRAPH

PROBABLE MAXIMUM FLOOD CALCULATION (PMP)

Drainage = 3.7 sq. mi.

From Hydrometeorological Report #33 "Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Duration of 6, 12, 24 and 48 Hours", 1966

For D.A. = 10 sq. mi.

6 hour rainfall duration.

PMP = 25" for Zone "C" at this Basin.

Since D.A. < 10 sq. mi., No area reduction to be applied
 PMP Values for various rain fall duration

<u>Duration</u>	<u>PMP (inch)</u>
6 hr.	25.0"
12 hr.	27.25"
24 hr.	29.25"
48 hr.	31.50"

PMP values are reduced by 20% to account for misalignment of Basin and Storm Isohyets.

<u>Duration</u>
6 hr.
12 hr.
24 hr.
48 hr.

PMP

Can be neglected.

NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. _____ OF _____

PMF DERIVATION - POST BROOK DAM & IRISH BROOK DAM JOB NO. 1212-001

PROBABLE MAXIMUM PRECIPITATION BY MAS DATE 7-28-71

PMP-PMF DERIVATION

1. SOIL GROUP 'C' & AMC II

2. $CN = 85$

Minimum loss rate for above condition

 $= 0.12"/hr$ or $0.012"/0.1hr$.For $CN = 85$ $S = 1.76$ in the Eq.

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

$$\approx Q = \frac{(P - 0.352)^2}{P + 1.408}$$

NEW JERSEY DAM SAFETY INSPECTION - (DEP) SHEET NO. 1 OF 2
 PMF DERIVATION - POST BROOK AND IRISH Brook JOB NO. 1212-001-1
 DIRECT RUNOFF BY KLB DATE 7-28-7

DIRECT RUNOFF INCREMENTS FOR COMPUTING - PMF

TIME ENDING (HR)	INCREMENTAL DESIGN RAINFALL (IN)	ACCUMULATIVE DESIGN RAINFALL (IN)	<u>DIRECT RUNOFF</u>		INCREMENTAL LOSS (IN)
			ACCUMULATIVE (IN)	INCREMENTAL (IN)	
0.10	0.20	0.20	0.00	0.00	0.00
0.20	0.20	0.40	0.00	0.00	0.00
0.30	0.20	0.60	0.03	0.00	0.03
0.40	0.20	0.80	0.09	0.06	0.14
0.50	0.20	1.00	0.17	0.08	0.12
0.60	0.20	1.20	0.28	0.11	0.09
0.70	0.20	1.40	0.37	0.11	0.09
0.80	0.20	1.60	0.52	0.13	0.07
0.90	0.20	1.80	0.65	0.13	0.07
1.00	0.20	2.00	0.80	0.15	0.05
1.10	0.24	2.24	0.98	0.18	0.06
1.20	0.24	2.48	1.16	0.18	0.06
1.30	0.24	2.72	1.36	0.20	0.04
1.40	0.24	2.96	1.56	0.20	0.04
1.50	0.24	3.20	1.76	0.20	0.04
1.60	0.24	3.44	1.97	0.21	0.03
1.70	0.24	3.68	2.18	0.21	0.03
1.80	0.24	3.92	2.39	0.21	0.03
1.90	0.24	4.16	2.60	0.21	0.03
2.00	0.24	4.40	2.82	0.22	0.02
2.10	0.30	4.70	3.10	0.28	0.02
2.20	0.30	5.00	3.37	0.27	0.03
2.30	0.30	5.30	3.65	0.28	0.02
2.40	0.30	5.60	3.93	0.28	0.02
2.50	0.30	5.90	4.21	0.28	0.02
2.60	0.30	6.20	4.50	0.29	0.01*
2.70	0.30	6.50	4.78	0.29	0.01
2.80	0.30	6.80	5.07	0.29	0.01
2.90	0.30	7.10	5.35	0.29	0.01
3.00	0.30	7.40	5.64	0.29	0.01

* MINIMUM LOSS RATE = $0.12"/HR = 0.012"/.1HR$ SAY $0.01"/.1HR$
 (AFTER THIS RATE IS REACHED, ABANDON CURVE FOR CONSTANT LOSS)

NEW JERSEY DAM SAFETY INSPECTION - (REP) SHEET NO. 2 OF 2

PMF DERIVATION - POSTBROOK & IRISH

BROOK JOB NO. 1212-001-1

DIRECT RUNOFF

BY HLB DATE 7-28-72

DIRECT RUNOFF INCREMENTS FOR COMPUTING - PMF

TIME FALLING (HR)	INCREMENTAL DESIGN RAINFALL (IN)	ACCUMULATIVE DESIGN RAINFALL (IN)	DIRECT RUNOFF		INCREMENTAL LOSS (IN)
			ACCUMULATIVE (IN)	INCREMENTAL (IN)	
3.10	0.75	8.15	6.36	0.74	0.01
3.20	0.75	8.90	7.09	0.74	0.01
3.30	0.75	9.65	7.82	0.74	0.01
3.40	0.75	10.40	8.55	0.74	0.01
3.50	0.75	11.15	9.28	0.74	0.01
3.60	0.70	12.05	10.17	0.89	0.01
3.70	0.75	12.80	10.91	0.74	0.01
3.80	0.75	13.55	11.65	0.74	0.01
3.90	0.75	14.30	12.39	0.74	0.01
4.00	0.73	15.03	13.11	0.72	0.01
4.10	0.28	15.31	13.38	0.27	0.01
4.20	0.28	15.59	13.66	0.27	0.01
4.30	0.28	15.87	13.94	0.27	0.01
4.40	0.28	16.15	14.21	0.27	0.01
4.50	0.28	16.43	14.49	0.27	0.01
4.60	0.28	16.71	15.00	0.27	0.01
4.70	0.28	16.99	15.05	0.27	0.01
4.80	0.28	17.27	15.32	0.27	0.01
4.90	0.28	17.55	15.84	0.27	0.01
5.00	0.28	17.83	15.88	0.27	0.01
5.10	0.22	18.05	16.10	0.21	0.01
5.20	0.22	18.27	16.32	0.21	0.01
5.30	0.22	18.49	16.53	0.21	0.01
5.40	0.22	18.71	16.75	0.21	0.01
5.50	0.22	18.99	17.03	0.21	0.01
5.60	0.22	19.15	17.19	0.21	0.01
5.70	0.22	19.37	17.41	0.21	0.01
5.80	0.22	19.59	17.63	0.21	0.01
5.90	0.22	19.81	17.84	0.21	0.01
6.00	0.22	20.03	17.86	0.21	0.01

* MINIMUM LOSS RATE = $0.12 \text{ "/hr} = 0.012 \text{ "/hr SAY } 0.01 \text{ "/hr}$
 (AFTER THIS RATE IS REACHED, GRAPHICAL CURVE FOR CONSTANT LOSSES)

HEC-1 - COMPUTATIONS

ENGINEERING CONSULTANTS, INC.

NEW JERSEY (STATE) DAM SAFETY INSPECTION SHEET NO. 1 OF
 POST BROOK AND IRISH BROOK DAMS JOB NO. 1212-001-1
 INPUT TO HEC-1 BY HLB DATE 9-21-78

INPUT TO HEC-1

#	ELEV. (FT)	HEAD ON SPINWAY CREST (FT)	POST BROOK DAM DISCHARGE (CFS)	IRISH BROOK DAM DISCHARGE (CFS)	Y2 STORAGE (A.C.-FT)	Y3 TOTAL DISCHARGE (CFS)
1	267.9 (SPINWAY CREST)	0.0	—	0.	990	0.
2	268.1 (SPINWAY CREST)	0.2	0	3.5	1005	3.5
3	269.0	1.1	27.3	45.0	1057	72.3
4	269.5	1.6	80.0	120.0	1100	200.0
5	269.9	2.0	88.0	230.0	1125	318.0
6	270.0 (TOP OF DAM)	2.1	89.0	238.6	1137	327.6
7	270.1	2.2	200.0	360.0	1148	560.0
8	270.5	2.6	500.0	700.0	1170	1200.0
9	272.0	4.1	2987.0	2703.8	1280	5692.8
10	276.0	8.1	15170.0	12300.0	1595	27470.0

HET-1 VERSION DATED JAN 1973

DAM SAFETY INSPECTION - NEW JERSEY STATE
POST BROOK AND IRISH BROOK DAMS 3 AND 4
PHF FLOOD ROUTING

NO NWR NMIN IDAY IMR IMIN MLTRC IPLY IPRT INSTAN
150 0 6 0 0 0 0 0 0 0 0
JOPER 0 NWT 0
JOPER 3 0

JOB SPECIFICATION

SUB-AREA RUNOFF COMPUTATION

INPUT UNIT HYDROGRAPH DERIVED FROM SCS METHOD

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME
3 0 0 0 0 0 0 1

HYDROGRAPH DATA

INTSG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL
0 -1 3.70 0.00 3.70 0.00 0.000 0 0 0

PRECIP DATA

NP STORM DAD DAK
60 0.00 0.00 0.00
PRECIP PATTERN
0.00 0.00 0.06 0.08 0.11 0.11 0.13 0.13 0.15
0.16 0.18 0.20 0.20 0.21 0.21 0.21 0.21 0.22
0.24 0.27 0.28 0.28 0.29 0.29 0.29 0.29 0.29
0.74 0.74 0.74 0.74 0.74 0.74 0.74 0.74 0.74
0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27
0.21 0.21 0.21 0.21 0.21 0.21 0.21 0.21 0.21

LOSS DATA

STRAIN OLTH RTOL ERAIN STRRS RTION STRTL CNSTL ALSHX RTIMP
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

GIVEN UNIT GRAPH: NUMG= 29

0. 220. 640. 1400. 2300. 3000. 3142. 2800. 2300. 1890.
1320. 1100. 860. 670. 520. 400. 300. 230. 180.
110. 75. 55. 40. 25. 15. 10. 5.
UNIT GRAPH TOTALS 24121 CFS ON 1.01 INCHES OVER THE AREA

RECESSION DATA

START= 0.00 ORCH= 0.00 RTION= 1.00

END-OF-PERIOD FLOW

TIME HAIN EICH COMP 0
1 0.00 0.00 0.
2 0.00 0.00 0.
3 0.00 0.00 0.



4	0.06	0.06	0.
5	0.08	0.08	13.
6	0.11	0.11	56.
7	0.11	0.11	159.
8	0.13	0.13	349.
9	0.13	0.13	623.
10	0.15	0.15	956.
11	0.15	0.15	1307.
12	0.18	0.18	1669.
13	0.20	0.20	2021.
14	0.20	0.20	2372.
15	0.20	0.20	2724.
16	0.21	0.21	3069.
17	0.21	0.21	3397.
18	0.21	0.21	3693.
19	0.21	0.21	3956.
20	0.22	0.22	4180.
21	0.22	0.22	4370.
22	0.27	0.27	4544.
23	0.28	0.28	4717.
24	0.28	0.28	4918.
25	0.28	0.28	5160.
26	0.29	0.29	5420.
27	0.29	0.29	5678.
28	0.29	0.29	5910.
29	0.29	0.29	6116.
30	0.29	0.29	6292.
31	0.74	0.74	6439.
32	0.74	0.74	6660.
33	0.74	0.74	7047.
34	0.74	0.74	7755.
35	0.74	0.74	8887.
36	0.89	0.89	10283.
37	0.74	0.74	11765.
38	0.74	0.74	13115.
39	0.74	0.74	14321.
40	0.74	0.74	15334.
41	0.27	0.27	16074.
42	0.27	0.27	16901.
43	0.27	0.27	16944.
44	0.27	0.27	16130.
45	0.27	0.27	15176.
46	0.27	0.27	13881.
47	0.27	0.27	12495.
48	0.27	0.27	11248.
49	0.27	0.27	10183.
50	0.27	0.27	9336.
51	0.21	0.21	8703.
52	0.21	0.21	8199.
53	0.21	0.21	7778.
54	0.21	0.21	7397.
55	0.21	0.21	7022.
56	0.21	0.21	6699.
57	0.21	0.21	6330.
58	0.21	0.21	6056.
59	0.21	0.21	5884.
60	0.21	0.21	5647.
61	0.00	0.00	5505.
62	0.00	0.00	5349.
63	0.00	0.00	5127.
64	0.00	0.00	4966.

65	0.00	0.00	0.00	4216.
66	0.00	0.00	0.00	3550.
67	0.00	0.00	0.00	2865.
68	0.00	0.00	0.00	2234.
69	0.00	0.00	0.00	1745.
70	0.00	0.00	0.00	1340.
71	0.00	0.00	0.00	1035.
72	0.00	0.00	0.00	798.
73	0.00	0.00	0.00	615.
74	0.00	0.00	0.00	469.
75	0.00	0.00	0.00	354.
76	0.00	0.00	0.00	271.
77	0.00	0.00	0.00	206.
78	0.00	0.00	0.00	157.
79	0.00	0.00	0.00	119.
80	0.00	0.00	0.00	90.
81	0.00	0.00	0.00	66.
82	0.00	0.00	0.00	47.
83	0.00	0.00	0.00	31.
84	0.00	0.00	0.00	19.
85	0.00	0.00	0.00	11.
86	0.00	0.00	0.00	6.
87	0.00	0.00	0.00	3.
88	0.00	0.00	0.00	1.
89	0.00	0.00	0.00	0.
90	0.00	0.00	0.00	0.
91	0.00	0.00	0.00	0.
92	0.00	0.00	0.00	0.
93	0.00	0.00	0.00	0.
94	0.00	0.00	0.00	0.
95	0.00	0.00	0.00	0.
96	0.00	0.00	0.00	0.
97	0.00	0.00	0.00	0.
98	0.00	0.00	0.00	0.
99	0.00	0.00	0.00	0.
100	0.00	0.00	0.00	0.
101	0.00	0.00	0.00	0.
102	0.00	0.00	0.00	0.
103	0.00	0.00	0.00	0.
104	0.00	0.00	0.00	0.
105	0.00	0.00	0.00	0.
106	0.00	0.00	0.00	0.
107	0.00	0.00	0.00	0.
108	0.00	0.00	0.00	0.
109	0.00	0.00	0.00	0.
110	0.00	0.00	0.00	0.
111	0.00	0.00	0.00	0.
112	0.00	0.00	0.00	0.
113	0.00	0.00	0.00	0.
114	0.00	0.00	0.00	0.
115	0.00	0.00	0.00	0.
116	0.00	0.00	0.00	0.
117	0.00	0.00	0.00	0.
118	0.00	0.00	0.00	0.
119	0.00	0.00	0.00	0.
120	0.00	0.00	0.00	0.
121	0.00	0.00	0.00	0.
122	0.00	0.00	0.00	0.
123	0.00	0.00	0.00	0.
124	0.00	0.00	0.00	0.
125	0.00	0.00	0.00	0.

1901 SOUTH NAVAL AVENUE, DENVER, COLORADO 80223

.....

ROUTE HYDROGRAPH THRU POST BOXES 3 AND 4

TIME	EXP	STOR	AVG IN	EXP OUT
1	990.	0.	0.	0.
2	990.	0.	0.	0.
3	990.	0.	0.	0.
4	990.	0.	0.	0.
5	990.	6.	0.	0.
6	990.	4.	0.	0.

7	991.	107.	0.
8	993.	294.	0.
9	997.	486.	1.
10	1005.	769.	3.
11	1013.	1182.	14.
12	1025.	1469.	30.
13	1040.	1845.	50.
14	1057.	2197.	74.
15	1074.	2548.	134.
16	1100.	2896.	202.
17	1125.	3232.	316.
18	1150.	3545.	432.
19	1173.	3825.	558.
20	1193.	4068.	684.
21	1208.	4275.	810.
22	1220.	4457.	936.
23	1229.	4611.	1062.
24	1238.	4747.	1188.
25	1245.	4859.	1314.
26	1252.	4950.	1440.
27	1253.	5019.	1566.
28	1256.	5074.	1692.
29	1262.	5119.	1818.
30	1268.	5154.	1944.
31	1273.	5179.	2070.
32	1277.	5194.	2196.
33	1281.	5200.	2322.
34	1284.	5199.	2448.
35	1286.	5184.	2574.
36	1287.	5154.	2700.
37	1288.	5109.	2826.
38	1289.	5049.	2952.
39	1290.	4974.	3078.
40	1291.	4884.	3204.
41	1292.	4779.	3330.
42	1293.	4659.	3456.
43	1294.	4524.	3582.
44	1295.	4374.	3708.
45	1296.	4209.	3834.
46	1297.	4029.	3960.
47	1298.	3834.	4086.
48	1299.	3624.	4212.
49	1300.	3399.	4338.
50	1301.	3159.	4464.
51	1302.	2904.	4590.
52	1303.	2634.	4716.
53	1304.	2349.	4842.
54	1305.	2049.	4968.
55	1306.	1734.	5094.
56	1307.	1404.	5220.
57	1308.	1059.	5346.
58	1309.	709.	5472.
59	1310.	354.	5598.
60	1311.	0.	5724.
61	1312.		5850.
62	1313.		5976.
63	1314.		6102.
64	1315.		6228.
65	1316.		6354.
66	1317.		6480.
67	1318.		6606.

68	1233.	2541.	3837.
69	1221.	2002.	3286.
70	1208.	1593.	2782.
71	1197.	1187.	2322.
72	1187.	917.	1916.
73	1178.	706.	1566.
74	1171.	591.	1270.
75	1165.	413.	1068.
76	1159.	314.	906.
77	1154.	239.	763.
78	1150.	182.	638.
79	1146.	138.	538.
80	1143.	104.	469.
81	1140.	78.	406.
82	1138.	56.	350.
83	1135.	39.	326.
84	1133.	25.	324.
85	1130.	15.	323.
86	1127.	8.	320.
87	1125.	4.	318.
88	1122.	2.	307.
89	1120.	0.	295.
90	1117.	0.	284.
91	1115.	0.	273.
92	1113.	0.	263.
93	1111.	0.	253.
94	1109.	0.	243.
95	1107.	0.	234.
96	1105.	0.	225.
97	1103.	0.	216.
98	1101.	0.	208.
99	1100.	0.	200.
100	1098.	0.	195.
101	1096.	0.	190.
102	1095.	6.	186.
103	1093.	0.	181.
104	1092.	0.	177.
105	1090.	6.	173.
106	1089.	0.	168.
107	1088.	0.	164.
108	1086.	0.	160.
109	1085.	0.	156.
110	1084.	0.	152.
111	1082.	0.	149.
112	1081.	0.	145.
113	1080.	0.	141.
114	1078.	0.	138.
115	1076.	0.	135.
116	1077.	0.	131.
117	1075.	0.	128.
118	1074.	0.	125.
119	1073.	0.	122.
120	1072.	0.	119.
121	1071.	0.	116.
122	1070.	0.	113.
123	1070.	0.	111.
124	1069.	0.	104.
125	1068.	0.	105.
126	1067.	0.	103.
127	1066.	0.	100.
128	1065.	0.	98.



129	1064.	0.	95.
130	1064.	0.	93.
131	1063.	0.	91.
132	1062.	0.	89.
133	1061.	0.	86.
134	1061.	0.	84.
135	1060.	0.	82.
136	1059.	0.	80.
137	1059.	0.	78.
138	1058.	0.	76.
139	1057.	0.	73.
140	1057.	0.	71.
141	1056.	0.	71.
142	1056.	0.	70.
143	1055.	0.	69.
144	1054.	0.	66.
145	1054.	0.	66.
146	1053.	0.	67.
147	1053.	0.	66.
148	1052.	0.	65.
149	1052.	0.	65.
150	1051.	0.	65.
SUM		426106.	
PEAK			TOTAL VOLUME
14041.			426106.
CFS	6874.	24-HOUR	2040.
INCHES	17.28	72-HOUR	17.85
AC-FT	3410.		3523.

TEOT

1000 TONITS MAXIMUM TO BE USED FOR CREATING

RUNOFF SUMMARY, AVERAGE FLOW

HYDROGRAPH AT	PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
ROUTED TO	3 16544.	7117.	2890.	2890.	5.70
	3 16041.	6874.	2840.	2840.	3.70

TEOT

.....
HEC-1 VERSION DATED JAN 1973
.....

DAM SAFETY INSPECTION - NEW JERSEY STATE
POST BROOK AND IRISH BROOK DAMS 3 AND 4
ONE HALF PMF FLOOD ROUTING

JOB SPECIFICATION
NW NHR NMH IDAY IHR IMIN METRC IPLT IPRT INSTAN
150 0 6 0 0 0 0 0 0 0 0
JUPER 0 NWT
JUPR 5
0

..... SUB-AREA RUNOFF COMPUTATION
.....

INPUT UNIT HYDROGRAPH DERIVED FROM SCS METHOD

ISTAQ ICOMP IECN ITAPE JPLT JPRT INARC
5 0 0 0 0 0 0 1
HYDROGRAPH DATA
IHYDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISHOW ISAME LOCAL
0 -1 3.70 0.00 3.70 0.00 0.500 0 0 0
PRECIP DATA
NP STORM UAJ DAK
60 0.00 0.00 0.00
PRECIP PATTERN
0.00 0.00 0.11 0.11 0.13 0.13 0.15
0.18 0.20 0.20 0.21 0.21 0.21 0.22
0.28 0.28 0.28 0.29 0.29 0.29 0.29
0.74 0.74 0.74 0.69 0.74 0.74 0.74
0.87 0.87 0.87 0.87 0.87 0.87 0.87
0.81 0.81 0.81 0.81 0.81 0.81 0.81

LOSS DATA

STMR DLTKR RTIOL ERAIN STRKS RTIOL STRTL CNSTL ALSMX RTIMP
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
GIVEN UNIT GRAPH: NUHGE= 29
0. 220. 640. 1400. 2380. 3000. 3142. 2800. 2380. 1890.
1420. 1100. 860. 570. 405. 305. 230. 180. 140.
115. 75. 55. 40. 25. 15. 10. 5.
UNIT GRAPH TOTALS 24112. CFS OR 1.01 INCHES OVER THE AREA

RECESSION DATA

STRTG= 0.00 GRCEM 0.00 RTIOL= 1.00

END-OF-PMF FLOW

TIME RAIN EXCS COMP Q
1 0.00 0.00 0.
2 0.00 0.00 0.
3 0.00 0.00 0.



4	0.06	0.06	0.06	0.
5	0.06	0.06	13.	
6	0.11	0.11	56.	
7	0.11	0.11	159.	
8	0.13	0.13	349.	
9	0.13	0.13	621.	
10	0.15	0.15	956.	
11	0.16	0.16	1305.	
12	0.16	0.16	1665.	
13	0.20	0.20	2021.	
14	0.20	0.20	2372.	
15	0.20	0.20	2724.	
16	0.21	0.21	3068.	
17	0.21	0.21	3397.	
18	0.21	0.21	3693.	
19	0.21	0.21	3956.	
20	0.22	0.22	4180.	
21	0.26	0.26	4370.	
22	0.27	0.27	4544.	
23	0.28	0.28	4711.	
24	0.28	0.28	4910.	
25	0.28	0.28	5160.	
26	0.29	0.29	5420.	
27	0.29	0.29	5678.	
28	0.29	0.29	5910.	
29	0.29	0.29	6116.	
30	0.29	0.29	6292.	
31	0.74	0.74	6459.	
32	0.74	0.74	6600.	
33	0.74	0.74	7047.	
34	0.74	0.74	7755.	
35	0.74	0.74	8687.	
36	0.89	0.89	10281.	
37	0.74	0.74	11765.	
38	0.74	0.74	13115.	
39	0.74	0.74	14321.	
40	0.74	0.74	15334.	
41	0.27	0.27	16079.	
42	0.27	0.27	16581.	
43	0.27	0.27	16944.	
44	0.27	0.27	16130.	
45	0.27	0.27	15176.	
46	0.27	0.27	13861.	
47	0.27	0.27	12495.	
48	0.27	0.27	11248.	
49	0.27	0.27	10183.	
50	0.27	0.27	9836.	
51	0.21	0.21	6703.	
52	0.21	0.21	8199.	
53	0.21	0.21	7779.	
54	0.21	0.21	7397.	
55	0.21	0.21	7022.	
56	0.21	0.21	6857.	
57	0.21	0.21	6380.	
58	0.21	0.21	6056.	
59	0.21	0.21	5828.	
60	0.21	0.21	5457.	
61	0.00	0.00	5505.	
62	0.00	0.00	5349.	
63	0.00	0.00	5127.	
64	0.00	0.00	4766.	

TABLE

65	0.00	0.00	4216.
66	0.00	0.00	3590.
67	0.00	0.00	2845.
68	0.00	0.00	2258.
69	0.00	0.00	1785.
70	0.00	0.00	1380.
71	0.00	0.00	1035.
72	0.00	0.00	798.
73	0.00	0.00	613.
74	0.00	0.00	469.
75	0.00	0.00	359.
76	0.00	0.00	271.
77	0.00	0.00	206.
78	0.00	0.00	157.
79	0.00	0.00	119.
80	0.00	0.00	98.
81	0.00	0.00	66.
82	0.00	0.00	47.
83	0.00	0.00	31.
84	0.00	0.00	19.
85	0.00	0.00	11.
86	0.00	0.00	6.
87	0.00	0.00	3.
88	0.00	0.00	1.
89	0.00	0.00	0.
90	0.00	0.00	0.
91	0.00	0.00	0.
92	0.00	0.00	0.
93	0.00	0.00	0.
94	0.00	0.00	0.
95	0.00	0.00	0.
96	0.00	0.00	0.
97	0.00	0.00	0.
98	0.00	0.00	0.
99	0.00	0.00	0.
100	0.00	0.00	0.
101	0.00	0.00	0.
102	0.00	0.00	0.
103	0.00	0.00	0.
104	0.00	0.00	0.
105	0.00	0.00	0.
106	0.00	0.00	0.
107	0.00	0.00	0.
108	0.00	0.00	0.
109	0.00	0.00	0.
110	0.00	0.00	0.
111	0.00	0.00	0.
112	0.00	0.00	0.
113	0.00	0.00	0.
114	0.00	0.00	0.
115	0.00	0.00	0.
116	0.00	0.00	0.
117	0.00	0.00	0.
118	0.00	0.00	0.
119	0.00	0.00	0.
120	0.00	0.00	0.
121	0.00	0.00	0.
122	0.00	0.00	0.
123	0.00	0.00	0.
124	0.00	0.00	0.
125	0.00	0.00	0.



AD-A060 014

HARRIS ECI ASSOCIATES WOODBRIDGE NJ

F/G 13/2

NATIONAL DAM SAFETY PROGRAM. IRISH BROOK DAM (NJ00204), PASSAIC--ETC(U)

AUG 78 R GERSHOWITZ

DACW61-78-C-0124

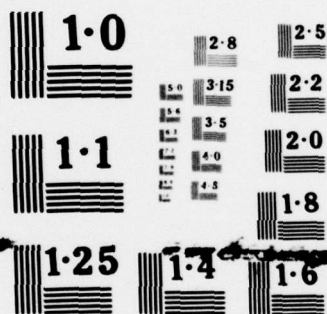
NL

UNCLASSIFIED

2 OF 2
ADA
060014



END
DATE
FILMED
12-78
DDC



NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

46	1107.	7444.	7423.
47	1101.	6994.	7164.
48	1251.	5938.	6419.
49	1265.	5938.	6038.
50	1277.	4880.	5590.
51	1269.	4910.	5370.
52	1362.	4225.	4974.
53	1359.	3994.	4641.
54	1249.	5794.	4432.
55	1243.	3604.	4193.
56	1237.	3220.	3970.
57	1232.	3247.	3761.
58	1228.	3096.	3563.
59	1223.	2971.	3394.
60	1220.	2868.	3244.
61	1216.	2788.	3112.
62	1214.	2713.	2997.
63	1211.	2619.	2884.
64	1208.	2473.	2764.
65	1204.	2349.	2617.
66	1199.	1941.	2424.
67	1196.	1603.	2135.
68	1187.	1280.	1844.
69	1181.	1001.	1657.
70	1174.	771.	1401.
71	1169.	593.	1176.
72	1163.	458.	982.
73	1158.	353.	778.
74	1154.	278.	748.
75	1150.	206.	632.
76	1146.	197.	537.
77	1143.	119.	470.
78	1140.	91.	409.
79	1134.	69.	358.
80	1135.	52.	326.
81	1131.	39.	324.
82	1131.	28.	322.
83	1128.	19.	320.
84	1126.	12.	316.
85	1124.	7.	311.
86	1121.	4.	299.
87	1118.	2.	287.
88	1116.	1.	276.
89	1114.	0.	266.
90	1111.	0.	256.
91	1109.	0.	246.
92	1107.	0.	236.
93	1103.	0.	227.
94	1104.	0.	219.
95	1102.	0.	210.
96	1100.	0.	202.
97	1098.	0.	194.
98	1097.	0.	192.
99	1095.	0.	187.
100	1094.	0.	182.
101	1092.	0.	178.
102	1091.	0.	174.
103	1089.	0.	169.
104	1088.	0.	163.
105	1087.	0.	151.
106	1086.	0.	157.

107	1004.	0.	133.
108	1031.	0.	130.
109	1082.	0.	146.
110	1080.	0.	143.
111	1079.	0.	139.
112	1076.	0.	136.
113	1077.	0.	132.
114	1076.	0.	129.
115	1075.	0.	126.
116	1074.	0.	123.
117	1073.	0.	120.
118	1072.	0.	117.
119	1071.	0.	114.
120	1070.	0.	111.
121	1069.	0.	109.
122	1068.	0.	106.
123	1067.	0.	103.
124	1066.	0.	101.
125	1065.	0.	98.
126	1065.	0.	96.
127	1064.	0.	94.
128	1063.	0.	91.
129	1062.	0.	89.
130	1062.	0.	87.
131	1061.	0.	85.
132	1060.	0.	83.
133	1060.	0.	81.
134	1059.	0.	79.
135	1058.	0.	77.
136	1058.	0.	75.
137	1057.	0.	73.
138	1056.	0.	72.
139	1056.	0.	71.
140	1055.	0.	70.
141	1055.	0.	69.
142	1054.	0.	69.
143	1053.	0.	68.
144	1053.	0.	67.
145	1052.	0.	66.
146	1052.	0.	66.
147	1051.	0.	65.
148	1051.	0.	64.
149	1050.	0.	63.
150	1050.	0.	63.

SUM	209514.	72-HOUR	TOTAL VOLUME
PEAK	9977.	1396.	209514.
CFS	8307.	8.77	8.77
INCHES	8.31	1732.	1732.
AC-FY	1641.		

TEOT

RUNOFF SUMMARY, AVERAGE FLOW

HYDROGRAPH AT ROUTED TO	PEAK	1-HOUR	24-HOUR	72-HOUR	AREA
3	8272.	3536.	1445.	1445.	3.70
3	7977.	3307.	1396.	1396.	3.70

ECI

1988 SOUTH NAVAJO, DENVER, COLORADO 80223

HCC-1 VERSION DATED JAN 1978

DAM SAFETY INSPECTION - NEW JERSEY STATE
POST BROOK AND IRISH BROOK DAMS 3 AND 4
PERCENT OF PMF FLOOD ROUTING

JOB SPECIFICATION
NO NHR NMIN IDAY IHR IMIN METRC IPLT IPRT NSTAN
150 0 6 0 0 0 0 0 4 0
JOPEK 0 NMT
3 0

SUB-AREA RUNOFF COMPUTATION

INPUT UNIT HYDROGRAPH DERIVED FROM SCS METHOD

ISTAG ICOMP IECON ITAPE JPLT JPRF INAME
3 0 0 0 0 0 1

HYDROGRAPH DATA
IHYDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOW ISAME LOCAL
0 -1 3.70 0.00 3.70 0.00 0.060 0 0 0

LOSS DATA
STRAK DLTKR RTIOL ERAIN STRKS RTIOL STARTL CNSTL ALSMX RTIMP
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

RECESSION DATA
STHTG= 0.00 UNCSN= 0.00 RTIOR= 1.00

END-OF-PERIOD FLOW
TIME RAIN EXCS COMP 0

SUM 17.98 17.98 933935.

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THRU POST BROOK DAMS 3 AND 4

ISTAG ICOMP IECON ITAPE JPLT JPRF INAME
3 1 0 0 0 0 1

ROUTING DATA
GROSS CLOS AVE INES ISAME
0.0 0.000 0.00 1 0

NTSPB NSTOL LAG INSKA TSK STORA
0 0 0 0.000 -1.

STORAGE	990.	1005.	1057.	1100.	1125.	1137.	1148.	1170.	1200.	1200.	1595.
OUTFLOW	0.	5.	72.	200.	518.	327.	560.	1200.	5692.	87478.	

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TEC II

1801 SOUTH NAVARRO DENVER COLORADO 80221

RUNOFF SUMMARY: AVERAGE FLOW

HYDROGRAPH AT ROUTED TO	PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
3	992.	427.	173.	173.	3.70
3	323.	245.	130.	130.	3.70

TEC

1001 SOUTH NAVAJO, DENVER, COLORADO 80221

APPENDIX E
STABILITY CALCULATIONS

Irish Brook Dam

Stability Calculations

New Jersey Dam Safety Inspection Group II

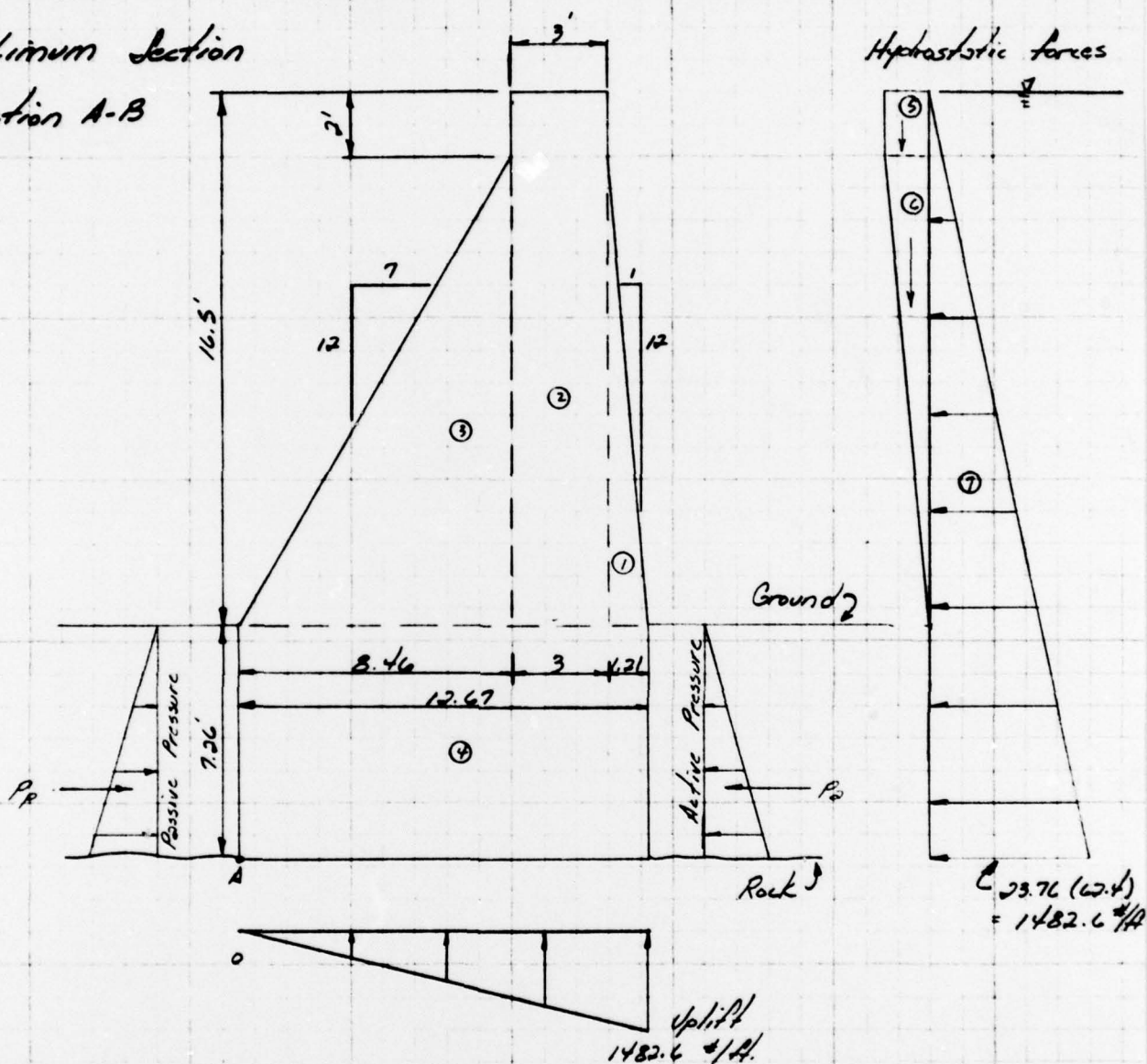
SHEET NO. 1 OF 2

JOB NO. 1212

BY M.R.H. DATE 8-10-78

Maximum Section

Section A-B



Passive Pressure

$$\phi = 30^\circ \quad \gamma = 130 \text{ pcf}$$

$$C_p = \frac{1 + \sin \phi}{1 - \sin \phi} = \frac{1.5}{0.5} = 3$$

$$P_R = C_p \gamma h^2 / 2 = 3(130)(7.26)^2 / 2 = 10280 \text{ lbs.}$$

Active Pressure

$$\phi = 30^\circ \quad \gamma_{\text{submerged}} = 138 \text{ pcf} \approx \gamma_{\text{buoyant}} = 138 - 62.4 = 75.6 \text{ pcf}$$

$$C_a = 1 - \sin \phi / 1 + \sin \phi = 0.5 / 1.5 = 1/3 \quad P_A = C_a \gamma h^2 / 2 = 1/3(75.6)(7.26)^2 / 2 = 664 \text{ lbs.}$$

Irish Brook Dam

SHEET NO. 2 OF 2

Stability Calculations

JOB NO. 1212

New Jersey Dam Safety Inspection Group II

BY M.R.H. DATE 8-10-78

Forces	Vertical	Horizontal	Arm	Moment about A
Concrete				
1. $14.5 \times 1.21 \times \frac{1}{2} \times 150$	1316 ↓		11.86	15608 Ⓢ
2. $16.5 \times 3 \times 150$	7425 ↓		9.96	73953 Ⓢ
3. $14.5 \times 8.46 \times \frac{1}{2} \times 150$	9200 ↓		5.64	51888 Ⓢ
4. $12.67 \times 7.26 \times 150$	13798 ↓		6.34	87479 Ⓢ
Hydrostatic				
5. $2 \times 1.21 \times 62.4$	151 ↓		12.07	1823 Ⓢ
6. $14.5 \times 1.21 \times \frac{1}{2} \times 62.4$	547 ↓		12.27	6712 Ⓢ
7. $1482.6 \times 23.76 \times \frac{1}{2}$		17613 ←	7.92	- 139495 Ⓢ
Soil				
Active Pressure		664 ←	2.42	- 1607 Ⓢ
Passive Pressure		10280 →	2.42	24878 Ⓢ
Uplift				
$1482.6 \times 12.67 \times \frac{1}{2}$	- 9392 ↑		8.45	- 79362 Ⓢ

↑ ΣV = 23045 lbs.

Ⓢ ΣM = 41877 #-ft.

$$x \text{ from A} = \frac{41877}{23045} = 1.817'$$

$$F.S. = \frac{262341}{220464} = 1.19$$

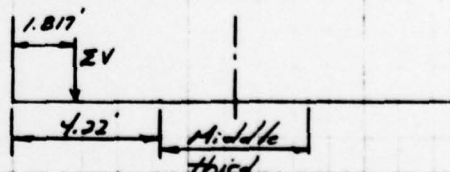
Without Uplift

$$\uparrow \Sigma V = 32437 \#$$

$$\text{Ⓢ } \Sigma M = 121239 \#-ft.$$

$$x = \frac{121239}{32437} = 3.738' < 4.22' \text{ Outside Middle third.}$$

$$\text{Bearing Pressure} = \frac{2(23045)}{3(1.817)} = 8455 \text{ psf.}$$



Irish Brook Dam

Stability Calculation

New Jersey Dam Safety Inspection Group II

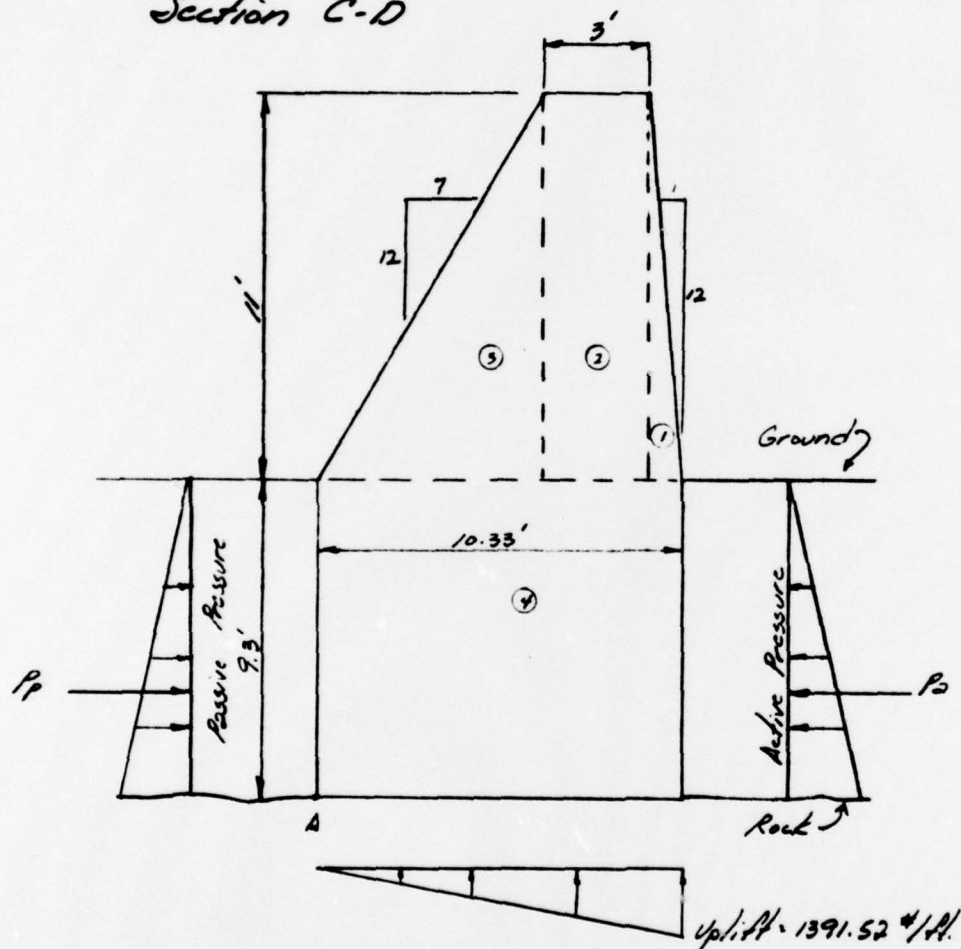
SHEET NO. 1 OF

JOB NO. 12/12

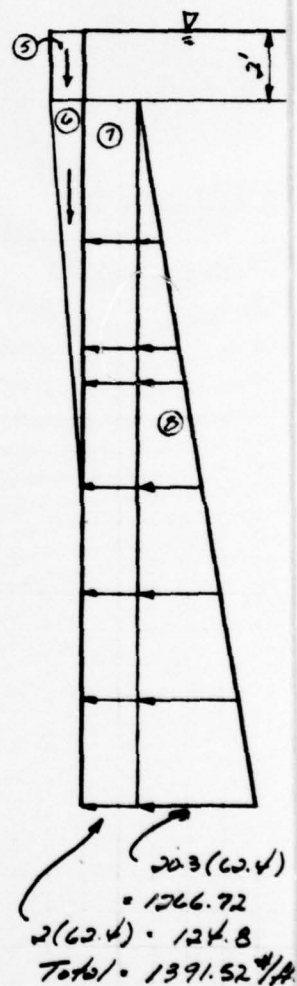
BY M.R.H. DATE 9-1-78

Spillway Section

Section C-D



Hydrostatic



$$C_p = 3 \text{ \& } C_a = \frac{1}{3} \quad (\text{See Maximum Section})$$

$$P_p = C_p \gamma h^2 / 2 = 3(130)(9.3)^2 / 2 = 16870 \text{ lbs.}$$

$$P_a = C_a \gamma h^2 / 2 = \frac{1}{3}(75.6)(9.3)^2 / 2 = 1090 \text{ lbs.}$$

$$\gamma = 130 \text{ pcf.}$$

$$\gamma_{\text{submerged}} = 138 \text{ pcf.}$$

$$\gamma_{\text{buoyant}} = 75.6 \text{ pcf.}$$

Irish Brook Dam

SHEET NO. 2 OF

Stability Calculations

JOB NO. 1212

New Jersey Dam Safety Inspection Group II

BY M.R.H. DATE 9-1-78

Forces	$\uparrow \downarrow$	$\rightarrow \leftarrow$	Arm	Moment about A (ft)
	Vertical	Horizontal		
Concrete				
1. $11 \times 0.92 \times \frac{1}{2} \times 150$	759 ↓		9.72	7377 Q
2. $11 \times 3 \times 150$	4950 ↓		7.91	39155 Q
3. $11 \times 6.41 \times \frac{1}{2} \times 150$	5288 ↓		4.27	22580 Q
4. $10.33 \times 9.2 \times 150$	14410 ↓		5.17	74500 Q
Hydrostatic				
5. $2 \times 0.92 \times 62.4$	115 ↓		9.87	1135 Q
6. $11 \times 0.92 \times \frac{1}{2} \times 62.4$	316 ↓		10.02	3166 Q
7. $2 \times 62.4 \times 20.3$		-2533 ←	10.15	-25710 Q
8. $20.3 \times 62.4 \times 20.3 \times \frac{1}{2}$		-12857 ←	6.77	-87042 Q
Soil				
Active Pressure				
		-1090 ←	3.10	-3379 Q
Passive Pressure				
		16870 →	3.10	52297 Q
Uplift				
$1391.52 \times 10.33 \times \frac{1}{2}$	-7187 ↑		6.89	-49518 Q
$\uparrow \Sigma V = 18651 \text{ lbs.}$ $\textcircled{R} \Sigma M_A = 34561 \text{ ft.-ft.}$				

$$x \text{ from A} = \frac{34561}{18651} = 1.853'$$

w/o Uplift

$$\uparrow \Sigma V = 25838 \text{ lbs}$$

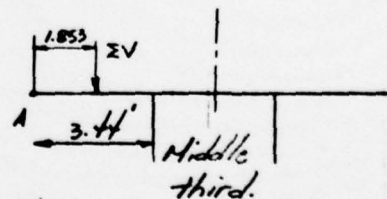
$$\textcircled{R} \Sigma M_A = 84079 \text{ ft.-ft.}$$

$$x = \frac{84079}{25838} = 3.25' < 3.44' \text{ Outside Middle third.}$$

Factor of Safety for Overturning:

$$R.M. = Q = 200210 \text{ ft.-ft.}$$

$$O.M. = D = 165649 \text{ ft.-ft.}$$



ENGINEERING CONSULTANTS, INC.

Irish Brook Dam

SHEET NO. 3 OF

Stability Calculations

JOB NO. 1212

New Jersey Dam Safety Inspection Group II

BY M.R.H. DATE 9-1-78

$$F.S. = \frac{500210}{165649} = 1.209$$

$$\text{Bearing Pressure (Max.)} = \frac{2 (18651)}{3 (1.853)} = 6710 \text{ psf.}$$

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NJ00204	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Irish Brook Dam Passaic County, N.J.		5. TYPE OF REPORT & PERIOD COVERED 9 / FINAL rept.
7. AUTHOR(s) 10 Robert/Gershowitz, P.E.		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Harris-ECI Associates 453 Amboy Ave. Woodbridge, N.J. 07095		8. CONTRACT OR GRANT NUMBER(s) 15 DACW61-78-C-0124
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Engineer District, Philadelphia Custom House, 2d & Chestnut Streets Philadelphia, Pennsylvania 19106		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 1014
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 6 National Dam Safety Program. Irish Brook Dam (NJ00204), Passaic River Basin, Irish Brook, Passaic County, New Jersey. Phase I Inspection Report.		12. REPORT DATE 11 August 1978
16. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) Approved for public release; distribution unlimited.		13. NUMBER OF PAGES
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		15. SECURITY CLASS. (of this report) Unclassified
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dams--N.J. National Dam Safety Program Phase I Irish Brook Dam, N.J. Dam Safety Dam Inspection		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.		